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STEEL

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ARC WELDING is easy with ENDURO

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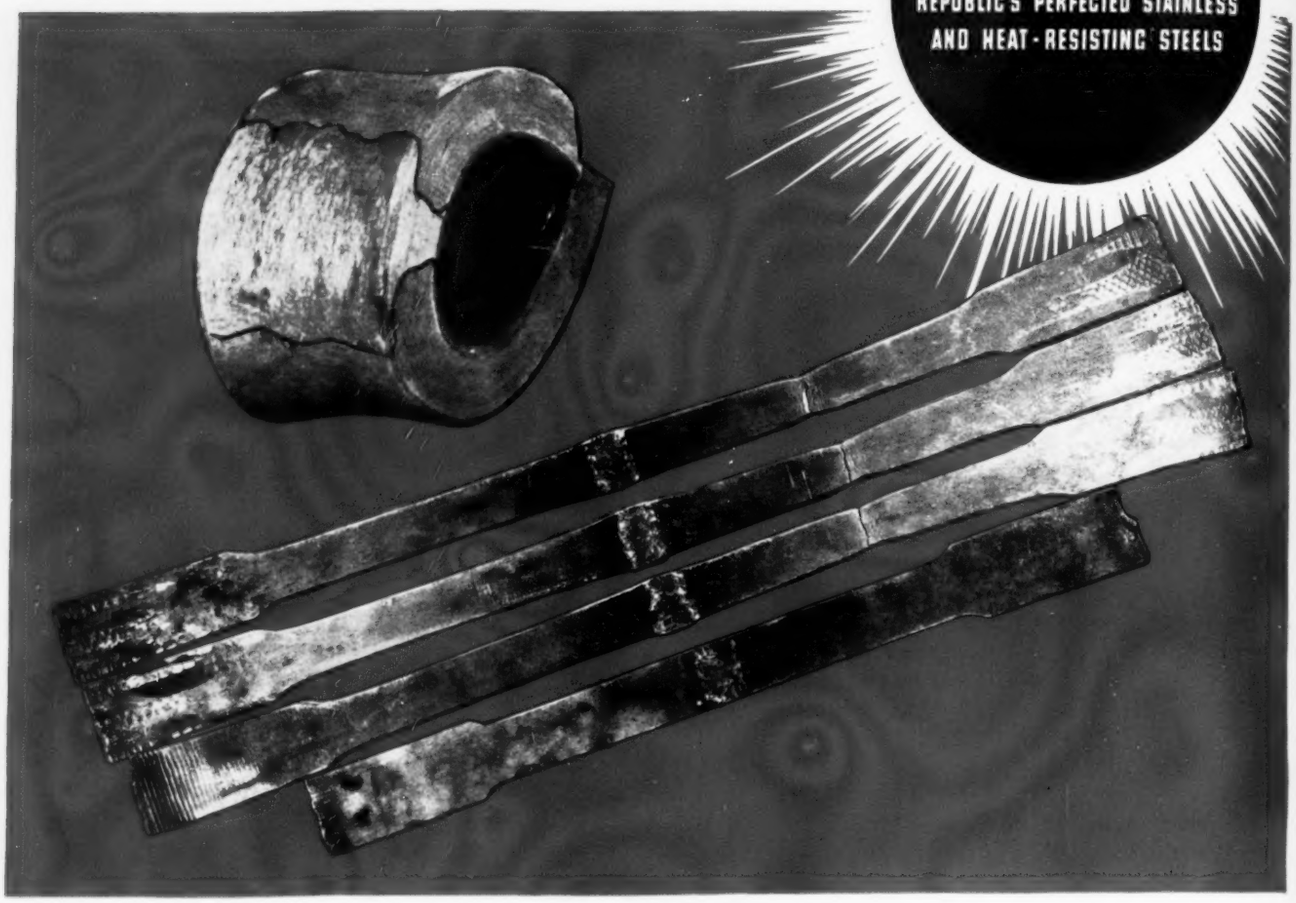
REPUBLIC'S PERFECTED STAINLESS AND HEAT-RESISTING STEELS



Electric arc welding produces highly satisfactory results in the welding of Republic ENDURO Stainless and Heat-Resisting Steels.

Reverse polarity will generally give the best results, but in some instances when heavy plates are to be welded, straight polarity produces better fusion and penetration. Scarfing the edges is not necessary on anything up to ⅛-inch thickness. For heavier sections scarfing is advisable. Because of the lower heat conductivity and lower melting point of ENDURO, less heat, therefore lower amperage, is required for the same size plate and wire than is used with ordinary steel. A flux-coated electrode should be used to prevent chromium oxidation, and rod or wire of the same analysis as the plate should be employed. Discoloration of the metal adjacent to the weld is only a surface condition and is easily removed by pickling or grinding and polishing.

These are just a few facts taken from Republic's Booklet No. 116—"The Welding of ENDURO Stainless Alloys," which discusses the subject in great detail. A copy will be sent on request.

Republic Steel
CORPORATION

GENERAL OFFICES · · · YOUNGSTOWN, OHIO
CENTRAL ALLOY DIVISION · · MASSILLON, OHIO

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STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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Contents . . July 29, 1935

Volume 97 ◆ Number 5

AS THE EDITOR VIEWS THE NEWS 9

Industry Hits PWA Use of Alien Steel as Menace to Labor 10

Improvement Burden of Early Steel Financial Returns 11

New Capacity 12
Transportation 12
Labor 12
Production 14
Meetings 15
Steel in the News 15
Makers', Users' Activities 22

Russia Cites Growth in Steel; Sees U. S. Only Rival.... 13

New Bridge Is Steel, but Appearance Suggests Concrete 15

Mirrors of Motordom 16

Windows of Washington 18

Industrial Men in the Day's News 20

Obituaries 21

EDITORIAL—Government Should Welcome Profits.... 23

THE BUSINESS TREND 24

ENGINEERING DEVELOPMENTS:

Progress in Machine Tools.... 26
Selecting Crane Gearing..... 30
Methods and Materials..... 32
Self-Aligning Coupling 33
Rustproofing Method 34
Plans for Metal Congress.... 34
Robert E. Kinkead 35
To Buy or Not To Buy—IX 36
Progress in Steelmaking..... 38
Open-Hearth Design—IX 40
New Equipment 46
Trade Publications 50

MARKET REPORTS AND PRICES 51-68

CONSTRUCTION AND ENTERPRISE 69

ADVERTISERS' INDEX 74

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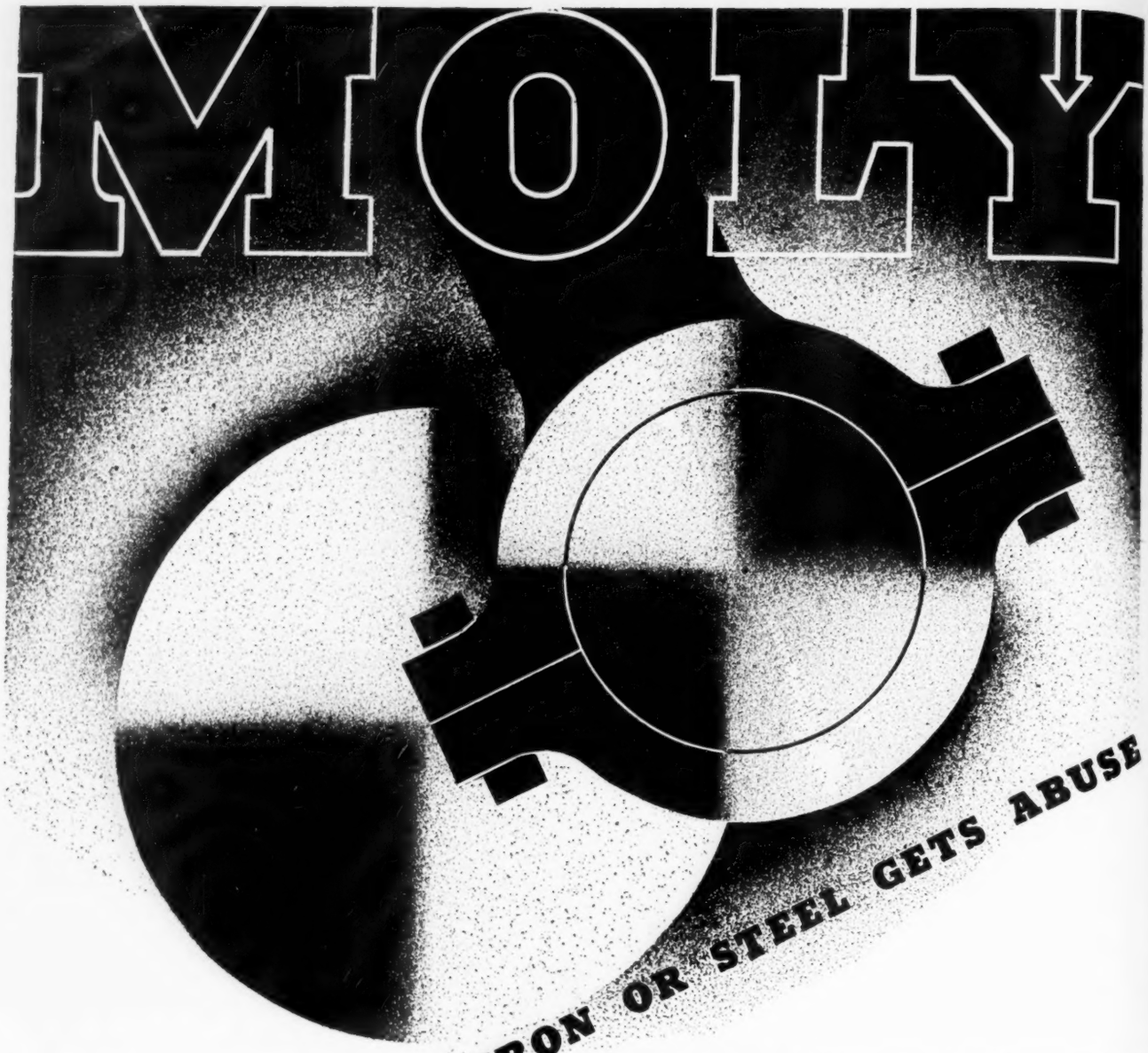


TORSION — like the relentless twisting of a heavily loaded crankshaft. IMPACT — like the incessant battering of a trip-hammer or pile-driver. HEAT — like the torturing temperatures encountered by boiler tubes and cylinder walls. . . . There are many types of steel, both alloyed and unalloyed, which will meet certain specified physical requisites for normal resistances to these enemies of metallurgy. But what happens to such steels when they are subjected to overloads? Often they fail — and usually their failure is dismissed with the conclusion that "nothing can be done about it." But something *can* be done to enable both iron and steel to withstand heavier abuses. And the most outstanding element in the recent development of this much-desired added quality is "Moly"— the alloy which not only improves ordinary iron and steel but which actually enables other alloys to do *their* particular work better.

Interesting details about the properties of Moly irons and steels will be found in these two books which may be had for the asking: "*Molybdenum in* 1934" and "*Molybdenum in Cast Iron* — 1934 *Supplement*" . . . while current progress and specific examples of Moly applications may be followed through our periodical news-sheet "*The Moly Matrix.*" A post-card request puts you on our mailing list. And — if you've some particular alloy problem you'd like to have us help you solve, our metallurgists and Detroit experimental laboratory are at your command. Climax Molybdenum Company, 500 Fifth Avenue, New York. (In Canada: Railway & Power Engineering Corp., Ltd.)

CLIMAX Mo-lyb-den-um

As the Editor Views the News

NEW deal bureaucrats are searching feverishly for excuses for keeping the staff of NRA on the government payroll. For weeks they have been trying to think up a plausible plan for surveying the steel industry. From the new deal standpoint, this idea has the merit of killing two birds with one stone. It would help preserve NRA jobs and, if the "survey" could be maneuvered into the form of an investigation, it would further the administration's campaign of villification against industry. Steel will be pilloried unless the few sound officials in NRA can curb the anti-industry zeal of the brain trusters.

• • •

Why Not Try Boondoggling?

Another idea calculated to entrench bureaucracy and to harass industry has been hatched. It provides that companies which comply with the regulations of voluntary fair trade practice agreements (p. 18) be permitted to display an emblem on their products. This ingenious method of trying to enforce voluntary agreements probably would prove to be more of a failure than the attempted boycott of the blue eagle days. The point is that every attempt to keep the NRA staff busy seems to involve unnecessary meddling with private business. We suggest boondoggling as an alternative activity for idle NRA hands. It costs no more and is less destructive.

• • •

Profit Despite Higher Costs

Current earnings reports are distinctly encouraging. In the manufacturing industries (p. 12) the profits for the June quarter in most cases exceeded those for the first quarter and for the second quarter last year. Earnings of iron and steel producers for the June quarter (p. 11) generally were somewhat less than in first quarter and in the June quarter of 1934. With few exceptions the profits for both groups for the first half topped those of the corresponding period last year. It is significant that the profits shown represent the margin of income over outgo after industry has shared liberally with employes in the expense occasioned by short weeks and high wages. The public should hail the return of industry profits as a wholesome sign of recovery (p. 23), but political demagogues probably will assail them as symbols of the iniquity of business.

• • •

What! No Jobs in Steelmaking?

Discovery last week of a joker in a PWA order dated May 25 caused representatives of the steel industry to hurry to Washington (p. 10) in protest against what seems to be another inexcusable blunder of the new deal administration. The order provides that all contractors engaged in public work must buy steel and other materials abroad when a saving of 15 per cent or more can be effected with satisfactory delivery. Apparently new dealers, reasoning that a dollar saved on materials means a dollar more for PWA laborers, forget that steelmaking provides jobs. Or is this just another case of a deliberate brain trust thrust at industry?

• • •

14 Points in Obsolescence

Every manufacturer who desires to hold his own in the highly competitive struggle for business will do well to compare the efficiency of his machinery and equipment with that of the most recently developed models. In comparing the old with the new, he should consider 14 important points (p. 26), all of which bear directly upon his ability to win his share of business in today's markets. . . . Plans announced for the seventeenth National Metal congress and exposition to be held in Chicago Sept. 30-Oct. 4 indicate (p. 34) that the show will be larger than any of its predecessors in the past five years. . . . Steelworks operations, up to 45 per cent (p. 51), reflect a continued growth in demand from miscellaneous consumers . . . A new coupling (p. 33) adjusts itself to both parallel and angular misalignment and is said to eliminate the necessity for shimming.

E. L. Shaner

Industry Hits PWA Use of Alien Steel as Labor Menace

STEEL producers became thoroughly aroused last week at the order of the public works administration in Washington that all contractors engaged in public work must buy steel and other materials abroad when a saving of 15 per cent or more can be effected, with satisfactory delivery. One result was that the American Iron and Steel institute dispatched a committee to Washington to try to stay the order, but its effort seemed abortive when the President late Friday pointed out the tariff on steel and said that that, plus a 15 per cent differential, should be ample protection.

Discovery of this order, apparently a "sleeper" and enacted May 25, has aroused the industry to a high pitch, producers realizing that its actual operation seriously menaces both the wage and price structure, a wage structure affecting more than 400,000 employes and a price structure which by its unsettlement could very well set the present expansion in business back many weeks.

Heavy Inroads Possible

To those familiar with the steel industry, there is not the slightest question but what 15 per cent under the domestic market could easily be done, and that it would be no time at all before satisfactory delivery service could be arranged by foreign sellers, on a wide and heavy tonnage of products.

Precisely what amount of steel will be involved in the new program, nobody knows. Details of the program have not been worked out sufficiently, and in many instances the projects have not been decided upon, to say nothing of the finer calculations which attend each and every job.

To date, despite the many weeks which have elapsed since the $4,880,000,000 appropriation was first approved, not a pound of steel has been purchased. Yet there is no question but what the tonnage in the end will amount to a heavy total.

But even should the tonnage be relatively small, it would be sufficient, with the present order operative, to bring down the whole structure of the iron and steel markets, thus jeopardizing not only the present expansion in business for some time to come, but wage schedules and profits of steel stockholders.

What chance the steel industry this ruling set aside remains to be seen. It is believed in trade circles that should this order be linked up, by any chance, with recent reciprocal treaties or with those which may now be quietly under negotiation, the chances will be difficult indeed.

The 15 per cent mentioned in the PWA order is reminiscent of a similar figure which also came as a shock to the industry more than a year ago, when the Washington administration in face of its encouragement to the industry, under NRA, to increase wages and prices, suggested that a 15 per cent reduction under code prices on government work would be acceptable and permissible. The suggestion was not accepted by the steel industry, which up to that time had not seen a profit in many months.

High Wages Endangered

Eugene G. Grace, president of the Institute, who made public the reaction of the steel industry at a press conference last Thursday following the quarterly meeting of the Bethlehem Steel Corp., pointed to the handicaps the American steel industry would encounter in meeting this foreign competition, should the new PWA order stand.

The hourly wage rate in the domestic steel industry, as of May, 1935, was 65½ cents, compared with 25 9/10 cents for Germany, 25½ and the many others which are adversely affected will have in having cents for England, and 17 cents for Belgium.

In the case of the latter country, which is an increasingly large exporter to this country, the prevailing wage rate in the steel industry is a little more than one quarter of the American rate, Mr. Grace emphasized. At present, he added, the American rate is more than 7 per cent above the 1929 rate.

And during this time, he also brought out, base steel prices have gone down. In fact, Mr. Grace made comparisons back to July, 1926, when the composite steel price was around $37.68 a ton, against $36.71 in July, 1929, $32.32 in July 1934, and an average of $32.40 for the first three weeks of July, this year. He stated that since the expiration of the steel code, wages, prices and trade practices in general have held.

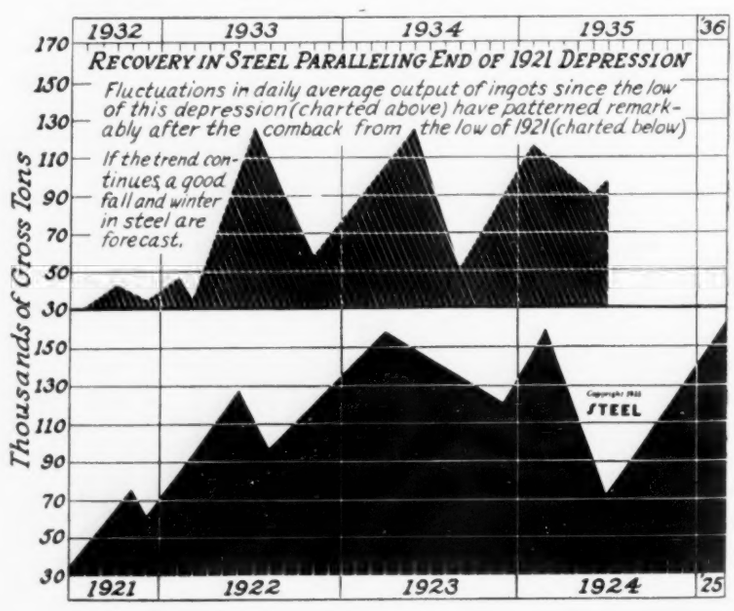
Sound Warning to Employes

Individual companies were planning last week to bring the matter to the attention of their employes, in event Washington did not withdraw or satisfactorily amend the order.

The American Rolling Mill Co., Middletown, O., for one, was contemplating calling meetings at its various plants. It has about 12,000 employes on its payrolls. Similar other protest gatherings were reported to be under consideration.

The chief issue upon which sentiment of labor is to be mobilized against the order is that the objective of the four billion dollar work relief appropriation is to relieve unemployment, whereas the use of foreign steel and other material will result in an actual increase in unemployment.

If Past Is a Guide, Good Fall and Winter Are Ahead



Detailed Comparison of Earnings of Iron and Steel Producers'

Companies listed are principally integrated producers of steel, but also include some with steel finishing capacity and some producers of pig iron

All figures are earnings, except where asterisk denotes a deficit

	Second Quarter 1935	First Quarter 1935	Second Quarter 1934	First Half 1935	First Half 1934	Ingot Capacity (tons)
Bethlehem Steel Co.	$1,800,909	$ 607,298*	$3,441,642	$1,193,611	$2,539,598	8,980,000
Republic Steel Corp.	922,329	1,834,235	864,125	2,756,564	805,443	5,013,000
Jones & Laughlin Steel Corp.	44,412	794,789*	886,252	750 377*	1,924,524*	3,671,200
Otis Steel Co.	435,493	952,362	524,725	1,387.855	1,177,614	872,000
Sharon Steel Hoop Co.	.....	.....	.....	540,866	436,671	450,000
Gulf States Steel Co.	66,662*	30,148	201,616	36,514*	191,803	401,000
Granite City Steel Co.	177,792	134,581	218,686	312,373	200,245	400,000
Ludlum Steel Co. (est.)	150,000	198,511	228,774	348,511	375,641	38,000
Virginia Iron, Coal & Coke Co.	29,555*	8,950	46,377*	20,605*	46,426*	.....
Acme Steel Co.	338,348	601,990	594,790	935,338	881,378	.....

Improvement is Burden of Early Steel Financial Returns

FIRST returns of iron and steel producers reporting for the second quarter are insufficient to indicate a trend.

As the above table, carrying all reports issued up to Friday night, indicates, Bethlehem and Jones & Laughlin greatly improved their showing in the second quarter, Granite City made a modest gain, Republic, Otis and Gulf States did not do quite so well.

Republic, which has again postponed its stockholders' meeting on the proposed merger with Corrigan-McKinney, has closed the best half year in the history of the present corporation.

Tuesday, the United States Steel Corp. will report, and by the end of this week the bulk of the industry's capacity will be available for comparative purposes.

BETHLEHEM IMPROVES FOR QUARTER, OFF FOR HALF

Bethlehem Steel Corp. emerged from red to black in the second quarter when it earned $1,800,909 after charges, compared with a loss of $607,298 in the first quarter. Improvement over the second quarter of 1934 also was shown, but for the half, this year the profit was only $1,193,611, against $2,539,598 a year ago.

Eugene G. Grace, president, emphasized that the present pace in steel was being maintained without the help of a large outlay of private funds for capital work. In some lines—automotive, agricultural and canning—business is outstanding. He pointed to the hand-to-mouth character of buying and thought it highly significant that steel should be so vigorous at a time when legislative uncertainties are so numerous.

A dividend of $1.75 on the preferred payable Oct. 1 to record of Sept. 6 was ordered. A comparison of Bethlehem's experience in the first half of 1935 follows:

	2nd Quarter 1935	1st Quarter 1935
Total income of the corporation and its subsidiary companies	$7,191,508	$4,474,649
Less—Interest and other charges	1,605,334	1,615,045
Balance	$5,586,174	$2,859,604
Less—Provision for depletion and depreciation	3,785,265	3,466,902
Net income for the period	$1,800,909	*$ 607,298

*Deficit.

GRANITE CITY STEEL TO SELL STOCK FOR MODERNIZATION

Granite City Steel Co., Granite City, Ill., proposes to raise funds by the sale of additional common stock for a general modernization program for its plant, according to announcement of Hayward Niedringhaus, president.

Stockholders at a special meeting last week voted to increase the authorized capital stock from 262,945 shares to 400,000. Mr. Niedringhaus stated it is impossible to anticipate the amount of money which the additional stock will bring, as the proposal must be acted on by the board of directors before the project may be carried out.

Recent price of the stock on the New York stock exchange has been around $26 a share, and the value of the additional 137,055 shares authorized, if issued at this price, would be $3,500,000.

The company has no further funded indebtedness or preferred stock outstanding. Figures for the first quarter show net sales of $1,584,490, against $868,203 for the same period in 1934, while for the same period, the net profit was $134,147 against a deficit of $16,147 for the first three months of 1934. The plant employs about 2500.

REPUBLIC'S FIRST HALF NET IS $2,756,563

Republic Steel Corp., Youngstown, O., reports less profit in the second quarter than the first but its showing for the first half year, as noted in the above table, was greatly improved. The experience of Republic in the second quarter of 1935 follows:

	2nd Quarter 1935
Net gain from operations (including profit on sale of securities, $8260) after deducting $5,337,964 for maintenance and repairs	$3,848,797
Less: Interest on indebtedness	738,480
	$3,110,317
Less: Depreciation of manufacturing plants, exhaustion of minerals and mining equipment	1,966,668
Profit from operations	$1,143,649
Preferred dividends on guaranteed stock of Trumbull-Cluffs Furnace Co. less discount on stock purchased for retirement ($11,970)	52,910
Net profit before federal income tax	$1,090,738
Provision for federal income tax (estimated)	168,410
Net Profit	$ 922,328

CORRIGAN 1934 LOSS $1,216,278

Loss of Corrigan, McKinney Steel Co., Cleveland, in the fiscal year ended April 30, after charges, was $1,216,278. In the preceding year the deficit was $1,403,817. The company will be taken over by the Republic Steel Corp., Youngstown, O., unless the government appeals the anti-merger suit which it recently lost in federal district court at Cleveland.

UNITED EXCHANGES COMMON

United Engineering & Foundry Co., Pittsburgh, states that its capital change plan has been approved by the Pennsylvania department of state, whereby holders of no-par common stock have surrendered holdings for exchange into two $5 par shares for each old share held.

New Capacity

STARK division of the Central Alloy district, Canton, O., plant, Republic Steel Corp., is to be entirely modernized at an expenditure of $850,000 for new equipment and plant capacity. More than 24,000 square feet of floor space will be added.

The new equipment will consist of two automatic three-high roughing mills; four two-high finishing mills with necessary additional cranes, substations and power lines; six pair and pack furnaces and additional pickling machines. A new pack shear and cold rolling equipment is also being added.

The expansion will not increase the plant capacity, but is being made for the purpose of improving the quality of the product. The work is now under way and will be completed by Nov. 1.

BETHLEHEM BUYS COLD-ROLLED TIN MILL FOR BALTIMORE

Work has been started on a $5,000,000 cold-rolling installation for the manufacture of tin plate at the Sparrows Point, Md., plant of the Bethlehem Steel Co., according to Eugene G. Grace, president. This will operate in addition to the present hot-rolling process for manufacturing tin plate at that plant. The Mesta Machine Co., Pittsburgh, will supply the equipment.

The new continuous mill at the Lackawanna plant, Mr. Grace said, will be completed about Jan. 1.

Transportation

INTERSTATE commerce commission has found the proposed cancellation of all-rail commodity rates on rough iron and steel castings, in less than carloads, from Birmingham, Ala., Chattanooga, Tenn., and points grouped therewith to Washington and north Atlantic ports, Baltimore to Boston inclusive, is justified. The order of suspension has been vacated by the commission and the proceeding discontinued.

GREAT LAKES LOSES CASE

In the case of the Great Lakes Steel Corp. against the Detroit, Toledo & Ironton railroad, the interstate commerce commission has found that the defendant's refusal to pay complainant an allowance for interchange switching of cars moving in interstate commerce to and from its plant at Detroit during the period Sept. 1, 1930, to Feb. 14, 1932, was not unjust and not to have subjected the complainant to the payment of unjust or unreasonable freight charges. The complaint has been dismissed.

SHOW RUSTLESS HOPPER CAR

A hopper car made of rustless steel developed by the Rustless Iron Corp. of America, with the co-operation of American Rolling Mill Co., was exhibited at the Pittsburgh & Lake Erie station, Pittsburgh, July 25. The car is claimed to be especially adaptable for use in hauling coal and has previously been exhibted at Chicago, Washington, Baltimore, Philadelphia, and New York.

HITS SWITCHING ALLOWANCES

Interstate commerce commission has ordered the Pennsylvania railroad to cease making allowances to the Weirton Steel Co. for switching services at Weirton, W. Va., and to the Pennsylvania, Wheeling & Lake Erie, and Baltimore & Ohio for similar service to the Timken Roller Bearing Co., Canton, O.

Steel Index Is Ready

The index of Volume 96 of STEEL, *for the first six months of 1935, now is ready for distribution. Copies will be sent to all subscribers requesting them.*

Labor

DOMINION STEEL & COAL CORP., Sydney, N. S., is raising wages of its 3000 workers 10 per cent Aug. 1, at the same time adopting the 8-hour day in the open-hearth, rail mill and yard departments, according to Sir Newton Moore, president. Company's annual wage cost—now $3,000,000 at 72 per cent operations—will be increased $500,000.

A. I. S. C. Sees Better Business, Reopens Offices

American Institute of Steel Construction, 200 Madison avenue, New York, has reopened three district offices—in Atlanta, Ga., St. Louis, and Dallas, Tex.—and realigned other district territories in anticipation of improved business from private buyers of structural steel.

Earlier in the year the Institute reopened its New England office, at 2 Homer street, Worcester, Mass., in charge of E. N. Adams. Other offices and their managers are:

Eastern Pennsylvania—B. F. Hastings, 15 East Wilmot avenue, Llanerch, Upper Darby, Pa. Atlanta—C. R. Bloxton, 405 Bona-Allen building. Cleveland — Alexander Miller, 2124 Guarantee Title building. Chicago—Henry Penn, 53 West Jackson boulevard. St. Louis—Robert J. Wood, Paul Brown building. Topeka, Kans.—Jack Singleton, 640 New England building. Dallas—L. H. Dodd, 3461 Purdue street. San Francisco—W. E. Emmett, 901 Russ building.

Comparison of Earnings of Equipment Manufacturers and Other Important Consumers of Iron and Steel

All figures are earnings, except where asterisk denotes deficit

	Second Quarter, 1935	Second Quarter, 1934	First Half, 1935	First Half, 1934
Edward G. Budd Mfg. Co., Philadelphia	$	$	$ 278,983	$ 64,766
Budd Wheel Co., Philadelphia			516,650	148,609
Caterpillar Tractor Co., Peoria, Ill.			2,908,153	2,061,530
A. M. Castle & Co., Chicago			170,695	162,520
Doehler Die Casting Co., Toledo, O.			360,706	
Noblitt-Sparks Industries Inc., Columbus, Ind.			243,068	140,632
Marion Steam Shovel Co., Marion, O.	* 71,263	*130,573	*190,815	*262,284
Blaw-Knox Co., Blawnox, Pa.			301,448	105,214
Pittsburgh Forgings Co., Coraopolis, Pa.	35,219			
Stewart-Warner Co., Chicago	524,428	372,765	1,020,491	540,260
Union Carbide & Carbon Corp., New York	5,332,528	4,779,505		
United States Pipe & Foundry Co., Burlington, N. J.			468,336	315,727
Midland Steel Products Co., Cleveland	309,469	222,754	653,500	293,651
Cutler-Hammer Inc., Milwaukee			221,438	105,489
General Refractories Co., Philadelphia			225,200	400,475
Ex-Cell-O Aircraft & Tool Co., Detroit	114,168	64,157	207,281	200,234
Pittsburgh Screw & Bolt Corp., Pittsburgh	* 714		* 83,932	
Symington Co., Syracuse, N. Y.	* 62,727	* 7,524	*129,906	* 83,644
McKeesport Tin Plate Co., McKeesport, Pa.			1,036,848	833,407
Foote-Burt Co., Cleveland			8,472	* 70,673
S. R. Dresser Mfg. Co., Bradford, Pa.			* 9,943	29,230
Parker Rust-Proof Co., Detroit	256,441	269,411	573,948	550,227
Briggs & Stratton Corp., Milwaukee	320,269	357,075	667,344	* 89,441
Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.			271,319	72,274

	Year ended June 30,'35	June 30,'34
Continental Can Co., New York	10,465,258	9,059,662
St. Louis Bolt & Nut Co., St. Louis	1,600	6,868

Russia Cites Growth in Iron, Steel; Sees U. S. Only Rival

A progress report on the iron and steel industry of Soviet Russia is given by the USSR chamber of commerce, Moscow, in a recent Bulletin of Economic Information. It follows, with Russian verbiage retained.

THE iron and steel industry has reached a wide scale of development. In March and April the pig iron and steel output have, for the first time, exceeded one million tons. Neither England nor France have ever at any period of their history, attained this figure.

With regard to the quality of the work the best works have now approached the level of the highest world production. At the Makeyevka works, for example, the extent to which the working volume of blast furnaces was utilized is determined by a 0.98 ratio for March. The Stalin works at Kuznetsk attained an equal ratio in April. The new open-hearth furnace section of the Dzerzhinsky works yielded in March 6.6 tons steel per square meter of hearth.

In 1937, 16,000,000 tons pig iron and 17,000,000 tons of steel will be produced; the daily output of pig iron will be 44,100 tons; steel, 46,500 tons. The output of rolled goods must rise to 36,000 tons daily.

Page the Steel Code!

The government has set the ferrous metallurgy staffs the responsible task of completing and putting in operation in 1935 six blast furnaces with a yearly output of 1,790,000 tons of pig iron, 34 open-hearth furnaces with a yearly output of 2,170,000 tons of steel, 28 electric furnaces with a yearly output of 242,000 tons of steel, 22 rolling mills with a yearly output of 1,798,000 tons of rolled goods, and five pipe rolling mills with a yearly output of 244,000 tons of iron pipes.

The main feature of this colossal program is that the new output capacity for steel will be much higher than the new output capacity for pig iron.

Extensive plans also have been made for the construction of new rolling mills. The new output capacity in this respect is almost three times greater than that attained in the course of the preceding two years.

Some years ago our engineers went to America with the object of studying the construction of new blast furnaces with a high output capacity. American engineers (and engineers of other countries, too) desiring to study this branch of construction, would now have to travel to Tula, Makeyevka, or Krivoi-Rog.

The biggest blast furnace in the south of the USSR will be put into operation at Makeyevka in the third quarter of the year; the volume of the furnace is 1165 cubic meters; daily output capacity—1200-1300 tons pig iron.

The remaining five blast furnaces have a volume of 930 cubic meters each, two of them are being built at the new Tula works, Moscow region, and one at the new Lipetsk works, Voronezh region. The Dzerzhinski and Krivoi-Rog works are putting into operation one blast furnace each. Blast furnaces are also being constructed at the New-Tagil works and Azovstal works.

Most of the newly-built open-hearth furnaces are huge furnaces with a calculated output of 150 tons of steel each. Five of those are about to start work at the Magnitogorsk plant. This will complete the first steel manufacturing section of that plant, consisting of 12 huge furnaces with a total yearly capacity of 1,000,000 tons of steel.

Needless to say, such furnaces or plants were unknown in pre-war Russia. There is not another plant like it in the whole of Europe. Yet it is not the only one in the USSR. The open-hearth furnace department of the Stalin works at Kuznetsk will be larger still, it will have 13 furnaces and the thirteenth furnace will yield 300 tons steel at a time.

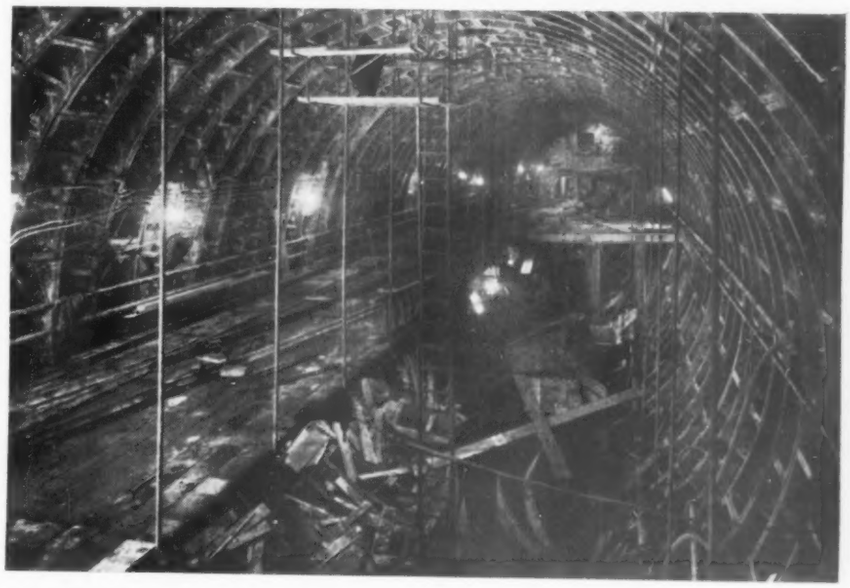
The three open-hearths of 250 tons each now erected at Azovstal works, (one of them already operating) are only a little below them in capacity. Big furnaces are also being put in operation at the Zaporozhstal works, Makeyevka, Dzerzhinski and Liebknecht works.

A Few Comparisons

An interesting comparison can be drawn between the construction of steel foundries in the Soviet Union and in America. During the last 20 years 1916 and 1931 were the only years when open-hearth furnaces in America increased their annual output by more than two million tons. The average annual increase in capacity between 1920 and 1931 was 940,000 tons. In the USSR it amounted to 575,000 tons in 1931, 790,000 tons in 1932, 1,420,000 tons in 1933, 1,170,000 tons in 1934, and over 2,000,000 tons in 1935.

A still more striking comparison can be made in the case of electric furnace construction. Only four

Where Human Termites Bore Under the Hudson



Progress on the Manhattan-Weekawken Hudson river tunnel, New York, is being made faster on the New Jersey side (depicted above) than on the New York side, where solid rock is being encountered. The daily average of 35 feet reached in digging in the under-river silt on the Jersey side is said to be a record. On May 28 the Jersey crew passed the New York boundary. In the background is shown the concrete bulkhead with the man locks in place. Material is handled over the narrow gage tracks laid on the platform. The tunnel is being built by the Mason & Hanger Co. for the Port of New York Authority

furnaces with a yearly capacity of 25,000 tons were built in the USA in 1934, whereas the USSR increased its output capacity in electric furnace steel by 130,000 tons in 1933 and 1934, and will increase it further by 244,000 tons in 1935.

The USSR is now the second largest steel producing country in the world and the USA is only a competitor now in the construction of rolling mills. Twenty rolling mills are shortly to be put into operation, 14 of which are to be complicated aggregates, with a high output capacity. The Magnitogorsk works, for instance, must put into operation four mills with a total output capacity of 600,000 tons of rolled goods. This will complete the first section of the Magnitogorsk works, which will produce both pig iron, large goods and every kind of sorted iron, including hoops, strips for welded pipes, squares, angles and other shapes.

A similar mill, for strip iron, with an equal capacity and fully mechanized, will be put in operation at the Makeyevka works. The output of gas pipes can then be greatly increased and the same strip can also be used for cold rolled ribbon, of which there is now reported a great shortage.

Bigger and Better Mills

A still larger mill, calculated to produce daily over 1000 tons of large sorted iron or mine rails, will start working at the Kuznetsk plant. A similar mill has been working for over 6 months at Magnitogorsk. This is the "500" mill—a perfect aggregate with a large output capacity. No mill like it has been erected anywhere in the capitalist world during recent years. One of the biggest wheel rolling plants in the world has been erected at the Karl Liebknecht works in Dniepropetrovsk; it will produce up to 240,000 railroad car wheels yearly.

The output of sheet iron will be considerably increased. A sheet iron plant with a high output capacity, has been put into operation at the Kuznetsk works.

The "Serp-i-Molot" plant in Moscow has been for some years producing sheet iron for automobiles. A cold rolling mill is now being erected so that the works will produce 20,000 to 25,000 tons of first class goods instead of the same amount of average sheet iron.

The construction of a sheet iron department at the Zaporozhstal works is no less important, for the new plant will be the biggest of its kind in Europe. It will be equipped with a conveyor plant producing 600,000 tons sheet iron yearly and with a number of cold-rolling mills which will produce fine sheet iron for the automobile industry. The mill weighs 22,000 tons, 10 times more than a blooming mill.

A total of 1521 million rubles* is being invested in the iron and steel industry, including mining.

* Normal valuation would be $760,000,000.

Production

FURTHER advances in the Cleveland, Pittsburgh and Youngstown districts put the steelworks operating rate up 2 points last week to 45 per cent, highest since the last week of April. In New England there was a slight decline; in other districts no change. New England will slow down again this week, but other districts will at least hold their own.

Birmingham, Ala.—steady at 31½ per cent, with the prospect that resumption of the southern rail mill for a few weeks in August will supply a mild lift.

Wheeling, W. Va.—Unchanged at 73 per cent of capacity through last week, as 27 out of 37 possible open hearths continued on active schedule. Individually, one steel producer here is bettering the district's average rate, but the rates of two others entering into the compilation maintain the average at 73 per cent.

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in 10 Leading Districts

	Week ended July 27	Change	Same week 1934	Same week 1933
Pittsburgh	41	+ 3	20	49
Chicago	49	None	34	58
Eastern Pa.	29	None	22½	42½
Youngstown	49	+ 3	35	67
Wheeling	73	None	27	80
Buffalo	37	None	29	63
Cleveland	48	+ 7	33	79
Birmingham	31½	None	20	77
New England	32	— 4	48	90
Detroit	94	None	76	55
Average	45	+ 2	29½	55

Pittsburgh—Up 3 points through last week to 41 per cent of capacity, the rates of the two leading interests strongly maintaining this rate. This is the highest rate of ingot operations for the Pittsburgh district in over three months, and more than doubles the rate at this week a year ago. Twenty-one steelworks blast furnaces are on here now, an increase of one over a week ago, due to the fact that Jones & Laughlin Steel Corp. has resumed with a third furnace at Aliquippa works. Individual rates now find Carnegie with 8 of 32 on in this district proper, Jones & Laughlin with 6 of 11, one of two each for National Tube, American Steel & Wire, Pittsburgh Steel and Pittsburgh Crucible, with Bethlehem having three of seven on at Johnstown, Pa.

Central eastern seaboard—While one eastern platemaker added an open hearth last week, steelmaking operations in this district are virtually unchanged at around 29 per cent. Indications are there will be little change again this week, as finished steel specifications, if anything, have been lighter the past week.

Buffalo—Operations here are now at their recent peak with 14 open hearths in production, representing 37 per cent of the district's capacity. The climb has been steady since the resumption of production following the Fourth of July holiday. Demand is general and many consumers are taking largely increased shipments of steel in comparison with their early summer releases.

Chicago—Unchanged at 49 per cent, the highest rate in nine weeks and nearly 50 per cent better than a year ago. The steady volume of incoming business indicates little immediate change in operations. Blast furnace schedules hold at 11 active steelworks stacks of 36.

Youngstown, O.— Jumped three points last week to 49 per cent, and expected to start this week at 53 per cent. This would be the highest rate since the end of May. While automobile requirements bulk large, they by no means predominate.

Cleveland-Lorain—Up 7 points to 48 per cent, Corrigan, McKinney Steel Co. adding two open hearths to operate seven; Otis Steel Co., one more, to make four. These two interests are at 50 per cent. National Tube Co., Lorain, continued with eight. Corrigan, McKinney also lighted its fourth blast furnace, but may take one off this week for repairs.

New England—Off four points to 32 per cent of capacity last week, with indications ingot operations this week will drop to the lowest point in more than two years, approximately 27 per cent, one works closing all open hearths for repairs.

CANADIAN PRODUCTION LITTLE CHANGED IN JUNE

Canadian production of steel ingots and direct steel castings in June totaled 73,450 gross tons, compared with 72,811 tons in May. For six months, the total is 388,163, against 397,522 tons a year ago.

Pig iron output in June was 44,555 tons, against 45,432 tons in May. For six months the pig iron total is 259,777 tons, compared with 157,827 tons in the same period of 1934.

Ferroalloys production in June was 3845 tons, as compared with 4987 in May. For six months, the ferroalloys total 22,192 tons, almost double the 12,135 tons of a year ago.

Meetings

ASSOCIATED Machine Tool Dealers will hold their annual meeting Sept. 9 at the Hotel Cleveland, Cleveland. Harry Barney, Koppers building, Pittsburgh, is secretary.

COOPER WINS AT GOLF

Pittsburgh chapter of the Institute of Scrap Iron and Steel held a golf tournament at the Westmoreland Country club, Pittsburgh, July 24. Abe Cooper, Wilkoff Co., Youngstown, O., had the low net score of the day and will represent the Pittsburgh chapter in the national golf tournament of all scrap iron chapter champions.

REFRACTORY GROUP TO MEET

Summer meeting of the Refractories division of the American Ceramic society will be held at Pennsylvania State college, State College, Pa., Sept. 20-21. A technical session on the afternoon of the first day will be devoted to "Trends in the Use of Refractories"; the rest of the time will be given to sports and entertainment.

Members of the Pittsburgh section, American Ceramic society and committee C-8, American Society for Testing Materials, are invited to attend. C. Ross Purdy, 2525 North High street, Columbus, O., is secretary of the American Ceramic society.

INSTITUTE TO MANCHESTER

Autumn meeting of the British Iron and Steel institute will be held in Manchester, by invitation of the iron and steel trades, heavy engineers and kindred trades of Manchester and district, from Sept. 16-18.

Steel in the News

SIDNEY B. WHIPPLE, reporter for the United Press association, has been selected by Bethlehem Steel Corp. to spend practically every waking minute of the coming year with Charles M. Schwab, chairman of Bethlehem, gathering material for a biography of the nestor of the steel industry.

J & L Licenses Aetna To Make Classifying Device

Aetna-Standard Engineering Co., Youngstown, O., recently acquired from Jones & Laughlin Steel Corp., Pittsburgh, exclusive license to manufacture and sell a new process and equipment for classifying sheet and tin plate made from continuous strip.

The strip is uncoiled, flattened, trimmed, accurately gaged, cut-to-length and automatically sorted into piles of light, medium and heavy gages, at the rate of approximately 250 feet per minute.

Sheets can be classified within narrow limits, but it has been found that the tolerance from standard gage of plus or minus 0.0005-inch constitutes good practice and will come within the rigid specifications of the consumer.

A novel feature of the process is the stagger piler. This device will accurately count and record the number of good sheets produced, in addition to stagger piling packs containing a predetermined number of sheets.

New Cleveland Bridge Will Be Steel But Its Appearance Suggests Concrete

A NEW bridge, first of its type ever constructed, whose towers, arches and general appearance suggest concrete, yet whose framework is entirely of steel, is under construction over the Rocky river valley on Lorain road, Cleveland. Arc welding is being used extensively in construction.

The new bridge, to cost approximately $500,000, replaces a pin-connected truss bridge and is of the open spandrel steel arch type, 1260.90 feet long overall. All structural steel is copper bearing.

The roadway of the new bridge is 40 feet wide, with a 5-foot concrete sidewalk on either side.

The bridge is supported on five 30-ton shop-fabricated floor beams carried on five pairs of steel towers, each resting on a concrete substructure and anchored to grilling embedded in the concrete.

The towers at each end of the bridge comprise two 30-foot sections. The three intermediate pairs of towers comprise three of these 30-foot sections. Each section weighs 30 tons. The sections are butt welded together in the field.

A total of 34 feet of welding is required in each butt joint. There are two of these butt welds in each of the four end towers, and three in each of the six intermediate towers, making a total of 26 butt welds, each containing 34 lineal feet of welding.

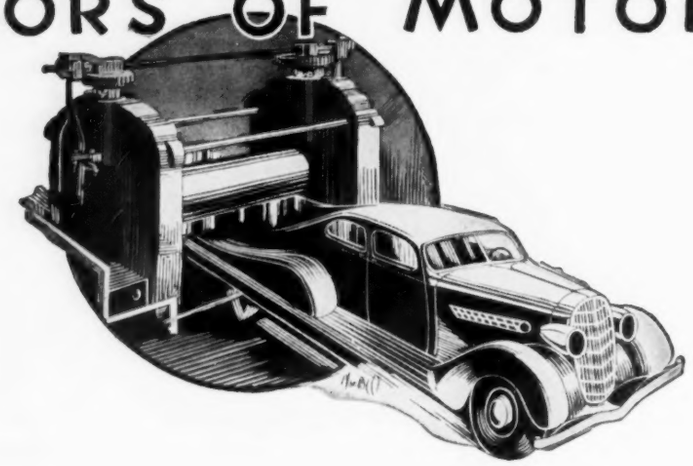
Arc welding is also being used in attaching the boss plates which tie the floor beams together. There are 350 of these plates. Welding also is being employed in construction of the arches, light standards and railings.

All welds used in building the bridge are required to show a tensile strength of 60,000 pounds per square inch. The welding is being done with shielded arc equipment supplied by the Lincoln Electric Co., Cleveland. The bridge is scheduled for completion by Nov. 1.

The Peoples Steel Co., Cleveland, is erecting the steel. The Lowensohn Construction Co. is the contractor.

Butt welding two sections of a tower for the Lorain road bridge, Cleveland. A total of 34 feet of lineal welding is being done on each of the 26 butt joints of the towers. Photo courtesy of the Lincoln Electric Co.

MIRRORS OF MOTORDOM



DETROIT

AFTER going along with the steel market for many months —in fact, rarely mentioning price—Ford has stirred steelmakers with a large inquiry accompanied by pressure for a Detroit base on products made here and for submission of quotations on an f.o.b. mill basis.

Superficially the objective appears to be lower prices, and to dangle up to 140,000 tons of steel before the industry is tempting. But there are some who discount so obvious an explanation.

They point out that a period of rising demand and prices is not the time to try to break the market, even with so large an inquiry, and that a Detroit base and f.o.b. prices would operate against each other peculiarly in the case of Ford.

They are wondering if the fact that Ford within a few months will become a steel producer of much greater magnitude has precipitated the present situation, and are speculating whether Ford is attempting to get his attitude concerning a Detroit base into the record before bringing in the new continuous mill at the Rouge.

Complex Price Situation

When this new mill is completed, some time this fall, Ford finishing capacity will be about 350,000 tons of carbon bars and 500,000 tons of strip and sheets—not sufficient to supply all requirements at the 1935 gait but a substantial tonnage nevertheless.

At present, carbon bars are 1.80c, Pittsburgh, and under the differential plan the delivered price in Detroit is 1.95c, instead of the Pittsburgh base plus 26½ cents freight. In the case of hot strip the market is 1.85c and the Detroit differential 20c.

Now, as a producer of bars and strip it is to the advantage of Ford and to the disadvantage of other automobile manufacturers to have the present setup continued. Were Ford to force a Detroit base of, say, 1.85c on bars it would lower the cost to General Motors and Chrysler $2 per ton, and scoop out some of the advantage of Ford in being a producer.

A further factor is that the higher the market the greater the bookkeeping margin for the Ford mills, which are believed to be high-cost propositions because of Mr. Ford's insistence on nickel-plated nuts, extremely clean floors, and other refinements.

Then take the matter of f.o.b. prices. These are believed to be sought in order to enable Ford ships to pick up material at Lake Erie and Michigan ports. Again, a Detroit base would defeat this purpose, for it would give other manufcturers their steel more cheaply than at present and neutralize the economy of water shipment.

Pressure Shows No Effect

Up to the end of last week, so far as was known, steel producers were standing pat on prices. A good volume of cold-rolled sheets was placed last week, but apparently at the full market and against former requirements.

At present, General Motors and Chrysler are on the sidelines. They profess to be entirely neutral, although demanding for themselves any concessions that might be made to Ford. But in the event steelmakers reject the pressure for a Detroit base, it will be in the record that Ford made the attempt, and he can operate the new mill on close to a Pittsburgh base, so far as bookkeeping is concerned.

General Motors, incidentally, is not believed to be as warm for a Detroit base as it once was. It realizes that the 20 and 25 cent differentials over Pittsburgh on steel for Flint, Lansing and other Michigan points lay down its steel cheaper than a Detroit base plus the freight to these cities.

Steel salesmen are prevented from using the argument except in a most indirect manner, but Ford, General Motors—and Chrysler to a lesser extent—sell automobiles on a Detroit base while jabbing away at the multiple steel basing point system. It is estimated that one leading low-price manufacturer nets $60,000,000 in a good year from assembling in various cities but charging the freight from Detroit.

The logic of financial reports of automobile manufacturers, now being issued, also is against pressure on prices. Chrysler, for example, reports a net of $18,659,309 in the first half of 1935, against $8,192,084 a year ago, not to mention increased working capital and other gains in the setup.

But, as previously mentioned, Chrysler is not active in attempting to force a reduction, nor is General Motors, which increased its first half net from $37,972,335 last year to $49,924,912 this year. The profit of these two—Chrysler and General Motors—probably will exceed by a wide margin the earnings of the entire steel industry in the same period.

Ford's large inquiry has excited speculation concerning the use of this material, whether for current models or new ones. This is tied up with the fact that the Rouge plant went down Friday night for the usual 2-week summer vacation, to resume Aug. 12. Incidentally, Ford purchasing officials remain on the job.

Retail Demand Still Lively

On resumption, current models still will be coming off the line. Ford, like most other manufacturers, is experiencing good enough retail demand to push 1936 models into the background a little. Stocks in the hands of both Ford and his body makers, for example, indicate continued assembly of 1935 models. Last week, Ford assembled 22,025 jobs.

But it is probable that shortly a start will be made on the production of parts for new series cars which require banks before assembling is undertaken. Murray is reported to have had 35,000 bodies for 1936 Fords as-

signed to it, and presumably a like number to Briggs, but no material has been released.

It still looks like a good bet that two big mechanical improvements Ford will push next year are the new wheels and the new cast pistons. Ford dealers recently received instructions that some cars will soon be coming through with a special designation on the cylinder block, and under no circumstances is the cylinder head to be removed without consulting the nearest factory branch. Kelsey-Hayes was rushing work last week on its foundry, to cast the new integral brake drum and hub.

Chrysler held its own in production last week, at above 15,000 units. On at least the DeSoto and Chrysler series next year an improved transmission will be featured, probably incorporating an overdrive. This overdrive, incidentally, will be made optional on the new low-price Nash for $50.

Shifts in "Big Three"

Chrysler's financial showing—relatively the best for any manufacturer thus far reporting—has led to some pencil sharpening. In production, Chrysler has not quite held its own this half. Taking Chrysler, General Motors and Ford, Chrysler this year has accounted for 23.3 per cent of the production, against 24.5 per cent a year ago. General Motors also has slipped, from 43.9 per cent last year to 38.4 per cent this year. Ford has stepped up from 31.6 per cent to 38.3.

To figure it another way, Chrysler production in the first half of 1935 was 486,578 units, a gain of 25 per cent over a year ago. But profits are up from $8,192,000 to $18,659,000, or 128 per cent; Per car, the profit this year has been $38.33, an increase of 82 per cent over the $21.08 per car last year.

Greater volume, of course, makes for manufacturing efficiency. Material costs, however, have not been reduced and labor, on the whole, is higher. It is possible that taking free wheeling, the automatic clutch, individual front wheel springing, and the intricate window ventilating system off Dodge and Plymouth contributed materially to the more profitable situation.

Chrysler and DeSoto lines probably were more remunerative in the first half of this year than last, but they are small fry in the Chrysler Corp. treasury. A comparison of General Motors earnings on a per car basis is impossible because its report covers a wide range of extraneous products, such as Frigidaire, etc.

Chevrolet still is turning out about 27,500 units weekly, and while it is expected to buy this week for the first 100,000 of the 1936 models, their production before October is doubted.

Principally for Chevrolet, but also for other subsidiaries, General Motors last week continued to buy equipment. Among GMC orders was one booked by the Erie Foundry Co., Erie, Pa., for 31 steam drop hammers, board drop hammers and trimming presses—which is a large order at any time.

Packard's 1935 performance on the 120 series reminds Detroit that all is not lost for makers in the class dubbed "medium-priced." It simply resolves itself into the fact that once car production gets above 2,000,000 annually, the field for Packard, Graham, Hudson, Hupp, Studebaker, etc., widens noticably.

But, to return to Packard. Last week, by July 26, a goal of 300 assemblies a day had been reached on the 120. Through earlier July, assemblies had been steady at around 275 to 280 a day.

The entire Packard plant, incidentally, goes down for its annual vacation and inventory on Aug. 10 until the 26th.

Surprisingly, the 120 is carrying Packard 8 and 12 along with it. Because it has authorized expenditures for important tool and die work on the higher-priced lines, Packard has ambitions for 6000 to 7000 of the eights and twelves alone for 1936. This is at the rate of 125 weekly. Packard's tool and die chief has been recently switched from working on the 120 to the super lines.

Changes on the 120 have been settled. In operation it was found that the bend of front fenders sliced into the front tires on sharp turns, so about an inch is being taken off the front downward flare to these parts. The tire wells are also to be deepened about 2 inches, taking away the undue prominence of the fifth wheel.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,700
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,746
May	214,411	330,455	364,727
June	249,727	306,477	361,320
6 Mo.	990,114	1,714,263	2,262,144
July	229,357	264,933	.....
Aug.	232,855	234,811	.....
Sept.	191,800	170,007	.....
Oct.	134,683	131,991	.....
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

Estimated by *Cram's Reports*

Week ended:

July 6	59,380
July 13	83,450
July 20	83,255
July 27	82,894

Shades of the Austin craze of a few years back have the motor people talking again. Down at Butler, Pa., near Pittsburgh, they're boosting for reopening of the Austin plant. The story goes that two American capitalists have the backing of a Buenos Aires millionaire to start making the midgets once more.

In return for starting up, the muncipality of Butler is to go along on taxes. Not only shall deficiencies be wiped out, but also a cut is to be worked in on the plant's valuation, and future taxes—still provided manufacturing recommences—must be slashed.

Pampas Put-Put

The Buenos Aires angle to the whole thing bears some logic. After Austin found it couldn't tempt the American public several years ago into riding in a glorified toy, it stumbled on a lucrative market in the Argentine. Residents of the pampas liked Austin's operating economy and, what is more, in that country the roads weren't overpopulated with big cars. Long after the American market sputtered and died, Austin was shipping cars to South America.

Last week, still another slant developed. Pullman-Standard Car Mfg. Co. got busy in the federal courts and probably rang another note to Austin's death knell. It succeeded in getting Judge R. M. Gibson at Pittsburgh to issue an order to the American Austin Car Co. to show cause why an order for its liquidation should not be granted. Pullman, with a plant right next door, holds a $150,000 mortgage on Austin's Butler real estate.

At Toledo, O., last week, Willys-Overland was faring some better. July 27 was set as the final date that objections could be made to court on why 10,000 additional cars couldn't be run off. Ever since Willys folded, the bondholders ($2,000,000) and the creditors ($8,000,000) have to go into a huddle each time and work out an agreement on who gets what when lots of 10,000 cars are manufactured.

Gradually, Willys is working up old inventory and is burning its bridges behind by selling equipment and properties. The lock, stock, and barrel sale of the affiliated forge division at Elmira, N. Y.—the Willys-Morrow Co.—is still on the fire. The subsidiary Wilson Foundry & Machine at Pontiac, Mich., was sold; Willys would like to peddle even more of its real estate and holdings.

In the wings, Founder John Willys, who has been in and out of Willys-Overland on more occasions than a few, still is an important figure. Though his health is impaired and a domestic life now seems to have the call over business, still there are some that say some day soon he will grab off Willys-Overland for a song and start anew.

WINDOWS OF WASHINGTON

WASHINGTON

DETAILS have not yet been entirely worked out for the proposed survey of the steel industry by NRA. There is considerable difference of opinion among officials on this study due to the fact that the first, and tentative, plan was admittedly rather radical.

In connection with the labor situation in the steel industry, it was suggested that a comparison be made of labor conditions in different types of plants.

For instance the New Dealers wanted to ascertain if labor conditions and the prospects of improving them are better or worse in small plants than in intermediate or larger organizations. For this purpose, the plan proposed to contrast specific inefficient and efficient small organizations.

In a similar way, the outline called for a comparison of relatively inefficient intermediate organizations with some of the well-known efficient organizations.

The proposed plan then asked for a survey of the labor policy of some of the larger steel companies and suggestions for plans of improving it.

Approaches Form of Probe

Industrial depression, and particularly the present one, has been the chief concern of the recovery administration and in view of this the suggestion is made that a principal objective of the study should be the promotion of a healthy and progressive stability.

Suggestion was made in the tentative outline that, in considering the relations of the steel industry to the government, it would be useful to examine how far the industry itself has assumed important characteristics of state operation.

It should also be considered, it is suggested, how far the dividends paid by small units indicate that these units are managed, in their owners' interest, more efficiently than the large ones.

Under the general heading of competition, the outline suggests the question "how far has competition been effective in the steel industry?" The suggested outline also raises the question, what evidence can be found of agreements prior to the code which tended to accomplish the purposes of the code provisions with respect to capacity, production and prices, including the matter of extras and basing points?

It will be noted by such suggestions as these that the proposed study would develop into more of an "investigation" than a "study," if matters of this kind are gone into.

WOULD MASS PUBLIC OPINION AGAINST NON-CODE EMPLOYERS

Brain Trusters—and others—seem to be sitting up these hot Washington nights, thinking of ways in which they can harass industry.

One of the latest methods seems to be ways for enforcing voluntary agreements. Such a study has been made at NRA and it deals with those who are against agreements and those who are for them.

Methods of enforcing voluntary agreements against parties to such agreements might include, it is contended, liquidated damages, penalty bonds, arbitration, etc. Also the force of government contracts in securing compliance with fair trade practice provisions as well as unfair trade practice or labor provisions.

Another method, it is suggested, would be the use of an insignia or label, and the building up of consumer interest in the insignia. Also, the influence and interest of labor unions in enforcing and protecting common standards; exemption from antitrust laws for group action in working under unfair and fair trade practices; the practical removal of threat of triple damages under antitrust laws; Enforcement under the federal trade commission act, civil suit for injunction by party to agreement, and the loss of business prestige in failing to live up to an agreement.

On the other hand, the methods of enforcing voluntary agreements against non-parties to the agreement as worked out at NRA might include, it is suggested, the absence of insignia and the building up of consumer resistance to unlabeled goods and inability to secure government contracts and loans, assuming the passage of new legislation or a change in interpretation by the comptroller general of existing laws.

Again, the experts think that the influence and interest of labor unions in enforcing and protecting common standards might be another way, as also the promoting of better uniform state laws and state compacts in areas where standards of labor are low.

The use of "cease and desist" orders against unfair trade practices and the possibility of their extension to protect certain types of fair trade practices where they can be shown to be in the public interest is considered.

Another method suggested is the exposure to prosecution under the antitrust laws by the department of justice, in the case of private agreements, and the legal and legitimate use of organized public opinion against non-compliers as a class, not as individuals.

These are only a few of the things that the Brain Trusters have turned their thoughts to recently.

SEE $24,000,000 NEEDED FOR NEW NAVY YARD TOOLS

A special board of experts of the navy department has just completed a survey of all of the navy yards of the United States which use any kind of machinery. The purpose of the survey was to see the condition of the

machinery. It was begun early in June.

It is understood that a report on the study will be made to the secretary of the navy sometime this week, and while nothing official is available it is said that the board found much obsolescence in all of the yards.

It has been estimated, it is reported, that it would cost some $24,000,000 to replace the outmoded machinery now in use in most navy yards. While the average trade practice would be to replace machinery every ten years or less, the average age of the machinery in the navy yards is 20 years.

In the present navy appropriation bill only $1,400,000 is available for the replacement of machinery in the yards. It is hoped that the secretary of the navy, following receipt of the report, will make an effort to get some money from the present emergency work relief funds.

It is pointed out that the American fleet is dependent on the navy yards to keep it in condition, in time of peace as well as war, and any improvement in the condition of machinery in the navy yard would only be consistent with the preparedness of the present administration in building the fleet up to treaty strength.

REPUBLICANS TO SERVE UNDER NEW DEAL ARE SCARCE

"Wanted — three Republicans" might be the subject of an advertisement which the President could insert in some of our best newspapers. Vacancies to be filled by Republicans are existing on the federal trade commission, the tariff commission, and the securities commission.

It is interesting to note that the President has been unable to find a "deserving" Republican to fill the position left vacant about a year ago on the trade commission when George C. Mathews was transferred to the new securities commission.

The only Republican member of the trade commission is Col. Charles H. March. Normally there are five members of the commission, but for the past year there have only been four.

Strangely enough, the only name that has been mentioned to fill this vacancy is that of James L. O'Neill, the acting administrator of NRA. It is known definitely that he would not accept the appointment.

INSTITUTE TAX BLAST DRAWS THREAT OF SENATE PROBE

Senator Schwellenbach, of Washington, last week challenged tax figures of the American Iron and Steel institute (STEEL, July 15, p 18).

He charged that the figures of the industry were inspired as part of the propaganda against the President's tax bill and urged that the senate investigate lobbying against the tax program.

After reading from an article in *Steel Facts*, published by the Institute, the senator charged as "palpably false" the statement that 66 cents of "every steel dollar" goes into taxes.

Declaring that the tax figure was reckoned out of the net income, whereas it would be only 4.5 per cent of the gross income, the senator said: "It is an effort on the part of those behind the article to influence congress to believe that such is the case in connection with the deliberations on the pending tax legislation.

"It is palpably fraudulent and I believe it is something that this committee should investigate," declared the senator. "When we get through with the utilities bill, I am going to ask that the committee call in the people from the steel industry and other branches of business which are seeking to influence this tax legislation."

COMMITTEE OK'S 30-HOUR BILL; PRESIDENT OPPOSED

The house committee on labor has favorably reported out the Connery 30-hour week bill. Representative Connery, backed by the A. F. of L., will make every effort to have this bill passed by the house during the present session. The administration is against the bill—and will do what it can to prevent its passage.

As the bill was reported out, everything after the enacting clause of the original Connery bill, was striken out, and an entirely new bill written and reported out.

After setting forth the fact that lengthy hearings were held, the committee in its report states that "with but few exceptions all of those who appeared before the committee voiced their approval and the need, especially during the present emergency, of legislatively shortening the hours of labor of those employed in the production of goods, articles and commodities which enter into our interstate and foreign commerce."

In concluding its report the committee states that it feels "that the speedy enactment of this legislation will be of inestimable value to the American people. It will add impetus to the appeal of President Roosevelt to American industry that they provide employment for the millions now idle."

HOLDS PACT WITH CUBA ADMITS MANGANESE FREE

Commissioner of Customs James H. Moyle has held that manganese ore and concentrates, including sinter manganese, produced in and imported from Cuba, are free of duty under the Cuban trade agreement of last year.

The commissioner, in a communication to collectors throughout the country, points out that manganese is admitted free under the Cuban trade agreement, and he states "in view of the established practice, the commodities mentioned (manganese) would have been admitted free of duty on Aug. 24, 1934, and they are accordingly entitled to free entry during the effective period of the Cuban trade agreement of Aug. 24, 1934, upon proof of Cuban origin and compliance with the pertinent customs regulations. Customs officers concerned will please be governed accordingly."

This is expected further to arouse domestic manganese interests, who are outraged by the trade pact with Russia lowering the manganese duty 50 per cent.

O'NEILL LEAVING NRA AUG. 1; COONLEY HIS SUCCESSOR?

James L. O'Neill, who would never accept any other designation than "acting" director of NRA, announced at his press conference Tuesday that he would leave the organization on or about Aug. 1.

Mr. O'Neill had intended staying until Sept. 1, but his own work as vice president of the Guaranty Trust Co., of New York, is calling him.

The President has asked Mr. O'Neill to designate someone to be his successor. It is expected to be someone within the organization, because as one official there said the other day "no one outside of NRA would be crazy enough to start as director."

It is expected that Mr. O'Neill will make two suggestions to the President; one will be Prentiss Coonley, now director of the NRA division of business co-operation; and the other, Dr. Leon C. Marshall, now director of the NRA division of review.

Indications are that Mr. Coonley will be the new director, although it is possible that the President will not accept the suggestions of Mr. O'Neill.

The NRA personnel has been cut from a high water mark of some 5000 employes, both here and in the field, to 3255 at present, making a saving in annual salaries of more than $3,000,000 a year. Mr. O'Neill anticipates that by the last of October there will not be more than 1500 employes in the organization.

Wackman Buys at Chester

Wackman Welded Ware Co., St. Louis, has acquired one of the plants formerly occupied by the H. H. Ward Co. at Chester, Pa., and will start production about Aug. 1 on steel barrels and drums. For the time being, at least, all steel will be purchased through the St. Louis offices.

The Ward company will continue general sheet fabrication at its remaining plant in this city.

Industrial Men in the Day's News

W. J. Smith, President, Oil Burner Institute

Although trained in engineering, for years he was active in sales work for three rubber companies.

He developed an oil burner which is now one of the chief products of the company he directs.

The Institute succeeds the American Oil Burner association, in which he has been prominent since 1927.

W. J. SMITH, executive vice president and general manager of Cleveland Steel Products Co., Cleveland, and president of the American Oil Burner association, will continue as president of the Oil Burner institute, the latter a reorganization and expansion of the American Oil Burner association, of which Mr. Smith has been a member since 1927, a director since 1929 and vice president from 1930 until this year.

Born in Buffalo, Mr. Smith received training in chemical and mechanical engineering and commercial law, and began his business career with the B. F. Goodrich Rubber Co. as chemical engineer. He was later associated in sales work for the Goodyear Tire & Rubber Co. and the Mohawk Rubber Co., in Pittsburgh, Kansas City, Mo., Dallas, Tex., San Francisco, and Los Angeles.

In January, 1923, he became associated with Cleveland Steel Products as sales manager. The company then made only parts as original equipment for automobile manufacturers. Mr. Smith developed an oil burner which is now one of the company's primary lines.

Two plants are operated now, one in Cleveland and one in Wellington, O., products including steel stampings, screw machine products, battery service station equipment, hardware specialties, oil burners, boiler-burning units and air conditioning plants.

In 1925 Mr. Smith was made general manager of the company, and in 1926 executive vice president and general manager.

♦ ♦ ♦

A. W. Phelps, tool and process engineer of the Delco-Remy division of the General Motors Corp., Anderson, Ind., has been named general manager of the Saginaw, Mich., steering gear division of the company.

♦ ♦ ♦

Neely Powers, Universal Steel Co., Cleveland, has been elected president and general manager of the Colson Corp., Elyria, O., caster manufacturer, which was recently reincorporated and the board increased from seven to nine members.

♦ ♦ ♦

A. B. Bok, formerly special service and development engineer of the Cincinnati Milling Machine Co., is now associated with the Kent-Owens Machine Co., Toledo, O., and will devote his efforts to milling machine problems and new machine developments.

♦ ♦ ♦

J. H. Cox, since 1929 district sales manager at Cleveland for the Braeburn Alloy Steel Corp., Braeburn, Pa., has been appointed western sales manager of the company, with headquarters remaining in Cleveland. Prior to 1929 he was associated in a sales capacity with the Midvale Co., Philadelphia.

♦ ♦ ♦

Alexander L. Feild, prominent consulting engineer, has been appointed professor of metallurgy at Carnegie Institute of Technology, Pittsburgh, effective with Sept. 1. Previously he has been consulting engineer with the Rustless Iron Corp., Baltimore, and also president of Alloy Research Corp., Baltimore. Earlier in his career, he was a chemist and metallurgist at the bureau of mines, Pittsburgh, from 1914 to 1918, and later, research metallurgist with Union Carbide & Carbon Co.

♦ ♦ ♦

J. W. Corey, sales manager, and S. B. Taylor, works manager, Reliance Electric & Engineering Co., Cleveland, have been elected to the board of directors.

♦ ♦ ♦

D. H. Gerstein, formerly in the management department of Jacob & Emil Leitner Inc., New York, is now a member of the firm of Gerstein Iron Works, Bronx, New York.

♦ ♦ ♦

Edward J. Burnell, general sales manager of the central division of Link-Belt Co., Chicago, has sailed for Europe to study coal handling, washing and preparation methods in England, Germany and Belgium.

♦ ♦ ♦

Athel F. Denham, operating a technical advisory service in Detroit, is now associated in an executive capacity with Schipper Associates, Detroit, public relations counsel, which has taken over the advisory service.

♦ ♦ ♦

Ernest K. Williams has been elected president and director of the Mitchell Specialty Co., Philadelphia, succeeding the late J. J. Seitz. Starting with the company over four years ago as sales engineer, Mr. Williams was named assistant to the president two years ago and has been acting president for the past six months.

♦ ♦ ♦

Harry S. Brown has been appointed president of the Foster-Wheeler Corp., New York, succeeding J. J. Brown, chairman and president, who has resigned from the latter office, but will continue as chairman of the board.

David McCulloch has been named executive vice president, and Walter F. Keenon Jr., George B. Ferrier and J. J. Nelis have been elected vice presidents.

Aid for New Products

A check sheet for use as a guide in the introduction of new industrial products is being issued by the bureau of foreign and domestic commerce, Washington, based upon a study by O. C. Holleran, of the marketing research and service division.

Died:

WILLIAM B. SCHILLER, 76, from 1902 to 1926 president of the National Tube Co., Pittsburgh, in Sewickley, Pa., July 25. Educated in Youngstown, O., he started in the steel business in 1883 as secretary of the Brier Hill Coal & Iron Co. In 1886 he became manager of the Youngstown Coke Co., and subsequently manager of the Monongahela Furnace Co., McKeesport, Pa. Six years later the latter company was merged with National Tube and he was appointed manger of steelworks and blast furnaces. In 1901 he was named first vice president, a year later becoming president.

♦ ♦ ♦

Albert C. Lehman, 56, chairman of the board of Blaw-Knox Co., Blawnox, Pa., and founder of its original unit, in Pittsburgh, July 24. He was noted for his activity in civic affairs and philanthropies. He was born in Pittsburgh, Oct. 14, 1878, and after education at Harvard university, organized the Blaw Collapsible Steel Centering Co., original unit of Blaw-Knox. He served the company first as vice president and later as president, continuing in that capacity until late 1934, when he was elected chairman of the board. Besides his position as director of Blaw-Knox, he was also on the board of a number of subsidiary and affiliated companies —the Lewis Foundry & Machine Co., Pittsburgh Rolls Corp., Union Steel Castings Co., National Alloy Steel Co., Blaw-Knox International Corp., and Blaw-Knox Ltd.

♦ ♦ ♦

C. G. Heer, 55, treasurer for many years and director of the Cleveland-Cliffs Iron Co., in Cleveland, July 24. He had been associated with Cleveland-Cliffs for over 30 years, beginning in a secretarial capacity and serving as secretary to William G. Mather for many years. He was elected treasurer in 1918. He also was director and treasurer of a number of companies affiliated with Cleveland-Cliffs.

♦ ♦ ♦

William Francis, 67, president of the Francis & Nygren Foundry Co., Chicago, in that city, July 21.

♦ ♦ ♦

James R. Pursell, 43, secretary of the Great Lakes Construction Co., Chicago, in San Francisco, July 20.

♦ ♦ ♦

Parvin F. Wright, 75, for years secretary-treasurer of the Central Machine Works, Indianapolis, in that city, recently.

♦ ♦ ♦

R. C. Polk, for many years Pacific Northwest representative with headquarters in Seattle of the American Cast Iron Pipe Co., in Tacoma, Wash., July 14.

♦ ♦ ♦

Maurice L. Burgham, 34, for the past nine years sales engineer for the Edgewater Steel Co., Pittsburgh, in that city, July 19.

♦ ♦ ♦

Fred W. Gordon, financier, manufacturer and a director of Pratt & Whitney Co. and Niles-Bement-Pond Co., in New Rochelle, N. Y., July 20.

♦ ♦ ♦

John Bath, 72, president, John Bath Co., Worcester, Mass., maker of small tools and gages, in that city, July 9.

♦ ♦ ♦

Arthur R. Miller, 58, associated for many years with the mining interests of subsidiary companies of United States Steel Corp., in Pittsburgh, July 22.

William B. Schiller

♦ ♦ ♦

Forrest Wendling, 39, secretary and treasurer of the State Machinery Co., in Indianapolis. He was one of the founders of the company, formed about five years ago and previously was associated with the Vonnegut Machinery Co.

♦ ♦ ♦

Maj. Charles L. Cantley, president of the Nichols Engineering & Research Corp. of Canada Ltd., Montreal, Que., at Scarboro Beach, Maine, July 14, drowned. He formerly was associated with the Nova Scotia Steel & Coal Co. and the American Solvay Corp.

♦ ♦ ♦

Judge C. B. Ames, 64, chairman of the board of Texas Corp., in Meredith, N. H., July 21. He had a distinguished legal career, was appointed assistant attorney general in 1919, and represented the government in the United States Steel Corp. case of 1920.

♦ ♦ ♦

H. L. Cary, assistant auditor in the Chicago office of American Steel & ire Co., and active with that company since 1893, in Chicago, July 17. Starting in the DeKalb, Ill., office of the company, later he was attached to the Cleveland, Worcester, Mass., and Chicago offices.

♦ ♦ ♦

Edward S. Illig, 56, former sales manager for the Bethlehem Steel Co. in the Buffalo district, in Atlantic City, N. J., recently. Before taking up his duties in Buffalo when Bethlehem took over the plant of the Lackawanna Steel Co., he was with Bethlehem in Pittsburgh. He retired six months ago.

♦ ♦ ♦

Frank Hamacheck Sr., 82, inventive genius and founder and president of the Hamacheck Machine Co., Kewaunee, Wis., in that city, July 18. Born in Austria, he came to America in 1867. He developed the business from a small foundry and machine shop to a plant valued at upward of $1,000,000 in physical equipment.

♦ ♦ ♦

Richard P. Zinn, 49, Michigan manager of mines for Pickands, Mather & Co., with headquarters in Ironwood, Mich., July 22. Born in Marinette, Wis., in 1909 he became associated with the Schlesingers of Milwaukee in the Newport mine at Ironwood. When Pickands-Mather, operating the Cary mine at Hurley, Wis., took over operation of the Newport mine, Mr. Zinn was named superintendent of both, and in January, 1931, he was given general charge of all Pickands-Mather shafts.

Revised Standard for Forged Tools Is Available

Division of simplified practice of the national bureau of standards has announced that simplified practice recommendation R17-35, forged tools, is now available in printed form. Copies may be obtained from the superintendent of documents, government printing office, Washington, for ten cents each.

The original simplified practice recommendation was formulated by the industry in 1924. The current revision covers kinds, sizes, weights, etc., of forged tools such as picks, mattocks, hoes, bars, wedges, sledges, hammers, and mauls, railroad track tools, blacksmith anvil tools, tongs, and miscellaneous tools. The dimensions and shape of the eyes for these tools are included. This recommendation is effective from May 1, 1935, subject to regular review by a standing committee of the industry.

Activities of Steel Users and Makers

WELDING Equipment & Machinery Corp., St. Louis, has merged with the Machinery & Welding Corp., Chicago. The personnel will remain the same and operations will continue under the name of Machinery & Welding Corp., 240 Boyle avenue. F. P. Kohlbry, president of the Chicago corporation, will be closely affiliated with the St. Louis office. Machinery & Welding Corp. has offices in Milwaukee and Kansas City, and will shortly establish a branch at Davenport, Iowa.

♦ ♦ ♦

Simonds Saw & Steel Co., 228 First street, San Francisco, has been appointed Pacific Coast representative for Abrasive Products Co., South Braintree, Mass.

♦ ♦ ♦

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has transferred its air conditioning department from East Pittsburgh to Mansfield, O., where it will become part of the merchandising division under A. E. Allen, vice president. Engineering and manufacturing of air conditioning equipment will be centered at East Springfield, Mass., with sales headquarters at Mansfield, O. The change is made to give closer co-ordination of air conditioning and other closely allied products now handled by the merchandising division.

♦ ♦ ♦

Link-Belt Co., Chicago, has appointed Chadwick Machinery Co., Milwaukee, distributor of its crawler shovels, cranes, draglines and locomotive track-type cranes.

♦ ♦ ♦

National Can Co., a partially-owned subsidiary of the McKeesport Tin Plate Co., McKeesport, Pa., has started production of beer cans on two long-term contracts for lithographed containers. One contract is with the Northampton Brewery Corp., Northampton, Pa., and the other with a large midwest brewer. The container is of 12-ounce capacity and is delivered lithographed with the brewing company's insignia.

♦ ♦ ♦

Shallcross Controls Inc., 3707 North Richards street, Milwaukee, has appointed several representatives for the sale of its automatic controls for combustion, pressure, liquid level and other applications, as follows: General Instruments & Controls Co., 205 West Wacker drive, Chicago; W. O. Taylor & Co. Ltd., Canada Cement building, Montreal, Que.; Kennedy B. Whitley, 332 West Seventh street, Erie, Pa.; Walter V. Gearhart Co., Volunteer building, Atlanta, Ga.; Morrissey, Kantenberger Co., Allen building, Dallas, Tex.; P. C. Heckman, 514 Main street, Cincinnati; James F. Strachen, 1014 Oxford street, Berkeley, Calif.; J. R. Fortune & Son, 604 Fisher building, Detroit.

♦ ♦ ♦

Quaker Sales Corp., Johnstown, Pa., is building a warehouse on Cooper avenue which will be completed about Sept. 1, when offices and stocks will be moved there. In the new warehouse a line of heavy hardware will be added to the mine and mill supplies already carried.

♦ ♦ ♦

A. M. Castle & Co., Chicago, shortly will open a warehouse at Oakland, Calif., where it has acquired the former property of the Liberty Iron Works. The plant has a floor area of more than 30,000 square feet in addition to ground space for expansion.

♦ ♦ ♦

Lynch Corp., Anderson, Ind., manufacturer of glass-blowing machinery, has booked three orders from England, one from Norway and one from Sweden. One of the machines, for blowing tumblers and glass containers, is the largest the company ever has built. The plant is operating at capacity.

♦ ♦ ♦

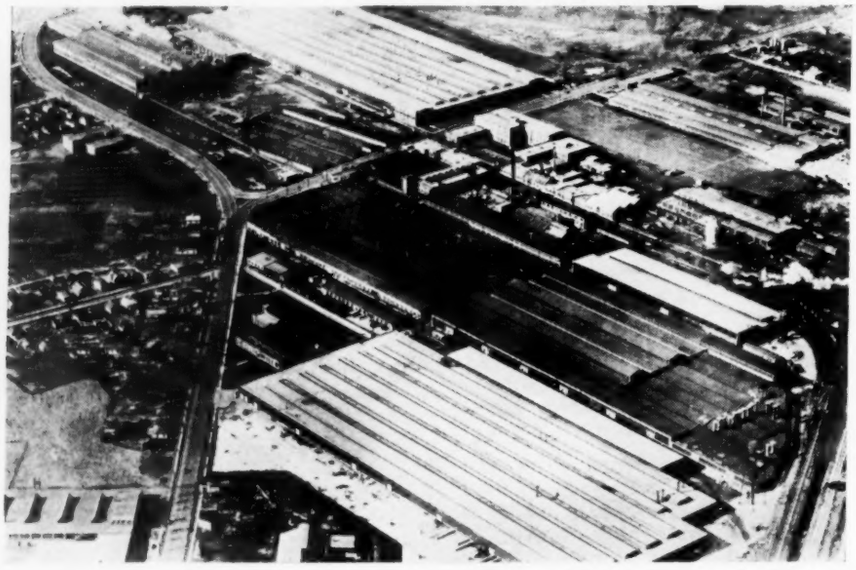
Norton Co., Worcester, Mass., has formed an Italian Norton company to manufacture grinding wheels and abrasive articles for Italy. Associated with the new company is Societa Anonima Produzione Mole Abrasive Richard Ginori, also a manufacturer of grinding wheels, located at Corsico, a suburb of Milan.

♦ ♦ ♦

Grammer, Dempsey & Hudson is a new steel warehouse organization, Newark, N. J., starting operations Aug. 1 at the former foundry plant of the Sacks-Barlow Foundries Inc., 212-240 Rome street, Newark, where the jobbers have leased 35,000 square feet under cover with an option to purchase. The new organization will do a general steel jobbing business, including cold-finished, handling domestic steels exclusively. Necessary alterations have been made to the plant which is equipped with two 5-ton cranes, one 10-ton, one 15-ton and two 1-ton cranes.

Paul O. Grammer is a former vice president of James A. Coe Co., Newark steel jobbers. Donald T. Dempsey is former secretary of the Edgcomb Steel Co., New York, and James Hudson was formerly with the Bethlehem Steel Co., shape department, New York. Associated with these three is H. Ross Anderson, formerly salesman with James A. Coe Co.

Birthplace of Diesel Tractors



Beneath these broad roofs, more than 6000 diesel tractors have been manufactured during the past four years. This air vista shows a panorama of the Caterpillar Tractor Co. plant at Peoria, Ill., covering 151 acres. Of the total, 52.5 acres are under roof, comprising 2,287,095 square feet of floor space. In the foreground is the receiving and assembly building, 1007 feet long. In center background is the road machinery building, 1200 feet long, where terracers, combines, and road maintenance machines are made. In the left background is the modern gray iron foundry. The white-roofed building at right center houses the shipping department, where Caterpillar tractors begin their journey, many going to distant lands. In these buildings was manufactured almost one-third of the total diesel horsepower produced in the United States last year

EDITORIAL

Government Should Welcome Growth of Industry Profits

REPORTS of company earnings now being issued are gratifying for two reasons. First, in most cases they show greater profits for the first half of 1935 than for the corresponding period of 1934. Secondly, they represent the ability of management to make headway in the face of unusual handicaps.

It is fair to say that the profit credited to each company is substantially below that which could have been earned had its management been guided by the principles prevailing in the depressions of, for instance, 1907 or 1921. During the current period, executives had to contend with conditions of hours, wage rates and other restrictions which were unknown in earlier lean periods.

That industry put up with these handicaps was due partly to the laws of the new deal, now for the most part declared unconstitutional; partly to the force of public opinion which has been overwhelmingly sympathetic to the idea of artificially pegged short hours, high wages and other restrictive measures against industry; and in part to the conscience of the leaders of industry which, independently of laws and public opinion, has dictated that industry should go to great lengths to prevent the burden of depression ills from bearing too heavily upon the shoulders of its employes.

Balance Sheets Show Industry Has Shared with Employes at Expense of Stockholders

Therefore the earnings statements reflect much more than the results of exceptionally good management. They show profits realized in spite of heavy expenditures for spreading work, for complying with the provisions of a highly developed government bureaucracy and for combating anti-industry attacks from many sources. In short, industrial companies have shared their incomes liberally with employes and others, and in doing so have reduced the margin of their profits for stockholders.

Many persons who have not been swept off their feet by the current national complex for sharing wealth, income, etc. believe that industry has gone far enough—if not too far—in submerging the profit motive. The fact that industry, while making such liberal contributions to humanitarian instincts, has been able to earn a profit should be gratifying to every citizen of the nation. Moreover, the public should realize that in the long run an adequate return on investment for industry is more important to the public interest than a continuation of the present artificial sharing of income.

Unfortunately the man in the street will be slow to grasp this point. He will be blinded by the propaganda of political demagogues who will attempt to persuade him that profits for industry are won by exploiting labor. It is almost certain that the current profits statements will be used as texts by the advocates of "share-the-wealth," "production-for-use" and other impractical ideas to launch a new attack against industry.

More Adequate Profits Essential to Recovery, Yet New Dealers Ridicule Profit Motive

Even now it is likely that some of the intellectual pinks, who constitute such a voluble part of the new deal bureaucracy, are busily engaged in preparing blasts against the "horrible" import of the "excessive" profits of industry. Perhaps some misguided new dealer is dusting off the famous Henderson report preparatory to spreading its distorted picture of profits to unsuspecting citizens who are unaware that it has been proved misleading and false.

If the present government administration could interest itself more in recovery and less in fanatical reform and foolhardy experiment, it would hail the growth of industrial profits as an encouraging sign of real improvement. If the thinking in Washington were focused more upon improving the welfare of the public and less upon keeping up the political fences for 1936 the energies of the executive and legislative department would be directed toward helping industry to increase its profits rather than toward characterizing profits as unworthy.

Industry's case is so sound and strong that in the end it will prevail with the public in spite of everything misguided politicians can do to confuse the issue. Profits, or the hope of realizing profits, constitute the principal motive for creating wealth. Creation of wealth is necessary to sound, lasting recovery. Therefore the profit incentive is necessary for business recovery.

Industry has suffered severely from the unprecedented deficits of a long depression. The return of profits—inadequate though they may be—is as important to the recuperative power of the wealth creating apparatus of this nation as is exercise to the long inactive muscles of a convalescent hospital patient.

THE INDUSTRIAL DIAL

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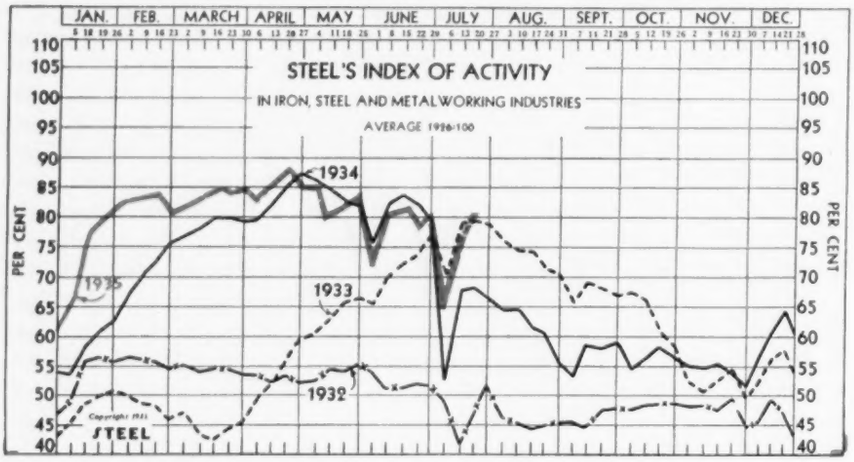


STEEL'S *index of activity in the iron, steel and metalworking industries gained 3.5 points to 80.0 in the week ending July 20.*

Week ending	1935	1934	1933	1932
May 18	80.5	82.4	65.2	55.1
May 25	82.8	81.9	66.1	54.2
June 1	71.9	75.7	65.3	51.0
June 8	79.3	82.3	69.9	51.1
June 15	80.0	83.6	72.1	51.8
June 22	77.3	81.8	73.9	51.6
June 29	78.4	79.4	77.0	49.2
July 6	64.1	52.3	71.4	41.7
July 13	76.5†	67.8	79.1	46.9
July 20	80.0*	68.1	79.4	51.5

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL*). Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings, power output and auto assemblies each 20.*

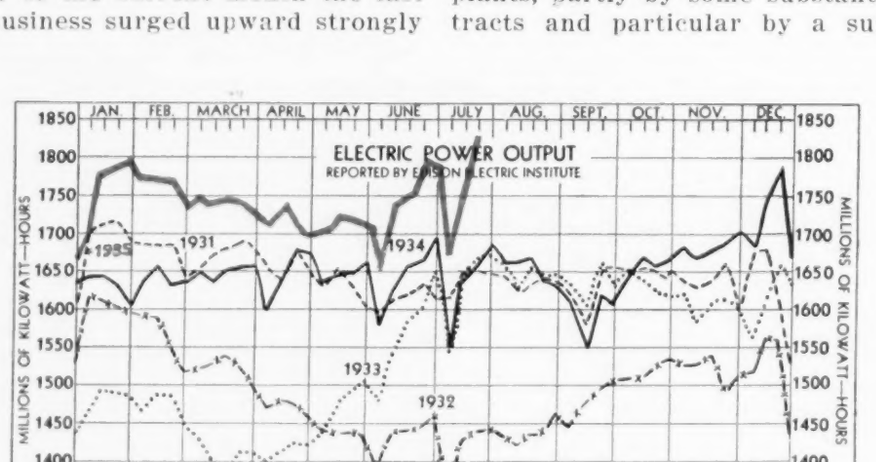
Trend Up Definitely in July for First Time Since 1928

JULY, 1935, has acquired two noteworthy distinctions. It is the first July in seven years in which the business trend has been definitely upward. Also it is the first month since the acute period of the depression in which the improvement in the durable goods industries has been positive enough to elicit marked attention.

On the first count, a review of the records shows that prior to the current month the last July in which business surged upward strongly was in 1928. July, 1934, was a dull, listless month of indefinite trend. In July, 1933, the spectacular "inflation boom" reached its peak and the reaction was in full swing before the month ended. July, 1932, marked the low point of the depression on many barometers. In 1931 and 1930, business in July was receding from spring peaks. In July, 1929, the trend was downward from a high that had been touched in June. In 1928 the trend was upward in July to a peak attained in the fall.

First notice of the revival in durable goods was prompted by the good showing of machine tool orders in recent weeks. This business was accounted for partly by equipment for automotive plants, partly by some substantial foreign contracts and particular by a surge of demand

Million Kw.-Hr. 1935	
July 20	1,807
July 13	1,766
July 6	1,655
June 29	1,772
June 22	1,775
June 15	1,743
June 8	1,724
June 1	1,629
May 25	1,696
May 18	1,700
May 11	1,701
May 4	1,698



Million Kw.-Hr. 1934	
July 21	1,663
July 14	1,647
July 7	1,556
June 30	1,688
June 23	1,675
June 16	1,665
June 9	1,655
June 2	1,576
May 26	1,655
May 19	1,649
May 12	1,643
May 5	1,632

from miscellaneous industries. However, the improvement extends beyond equipment classified as machine tools. Railroad rolling stock, barges, industrial buildings, heavy handling machinery, pipe lines, etc. have figured in recent awards to the so-called heavy industries.

Activity in these diversified lines now appears to be sufficiently strong to take up in part or in whole the slack which will be caused by the curtailment of activity in the automobile industry in August. If this expectation is fulfilled, industry may yet go through the summer with little or no trace of the customary seasonal dullness.

As the end of July approcahes, the barometers of business indicate that most of the losses sustained since May have been regained.

Steelworks operations have rebounded sharply from the low point of early July. The consumption of electric power is approaching all-time records. The output for the week ending July 20 was the highest recorded in any summer month and has been exceeded only a few times—in winter months. Car loadings, while slow to swing into line with the other principal barometers, are gaining steadily.

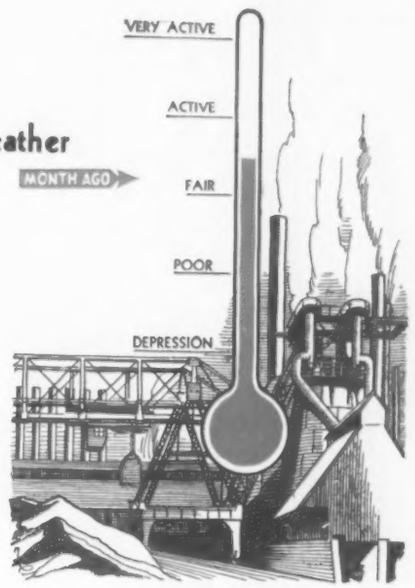
STEEL's index of activity has worked back to 80, which means that it has recovered virtually all of the ground lost since late in May. Another gain in the index is indicated for the final week of July.

Where Business Stands

Monthly Average, 1934—100

	June, 1935	May, 1935	June, 1934
Steel Ingot Output	109.8	118.6	144.9
Pig Iron Output	118.6	127.8	147.3
Freight Movement	104.3	97.6	103.9
Building Construction	180.1	175.3	110.8
Automobile Output	156.3	159.8	132.8
Wholesale Prices	106.0	106.7	99.5

Industrial Weather



TREND:

Upward

The Barometer of Business

Industrial Indicators

	June, 1935	May, 1935	June, 1934
Pig iron output (daily average, tons)	51,949	55,986	64,563
Machine Tool Index	76.7	67.1	42.6
Finished Steel Shipments (tons)	578,108	598,915	985,337
Ingot output (daily average, tons)	89,236	97,624	116,006
Dodge Bldg awards in 37 states (sq. ft.)	22,878,800	22,276,200	13,986,500
Automobile output	377,065	385,486	321,956
Coal output, tons	30,264,000	26,790,000	26,424,000
Business failures; number	961	1,027	1,033
Business failures; liabilities	$20,463,097	$15,669,627	$23,868,293
Cement production, Bbls.		8,222,000	8,786,000
Cotton consumption, bales	386,000	469,250	363,000
Car loadings (weekly ave.)	614,953	578,055	615,640

Foreign Trade

	June, 1935	May, 1935	June, 1934
Exports		$165,457,000	$167,957,000
Imports		$170,559,000	$135,048,000
Gold exports		$49,000	$6,586,000
Gold imports		$140,965,000	$70,291,000

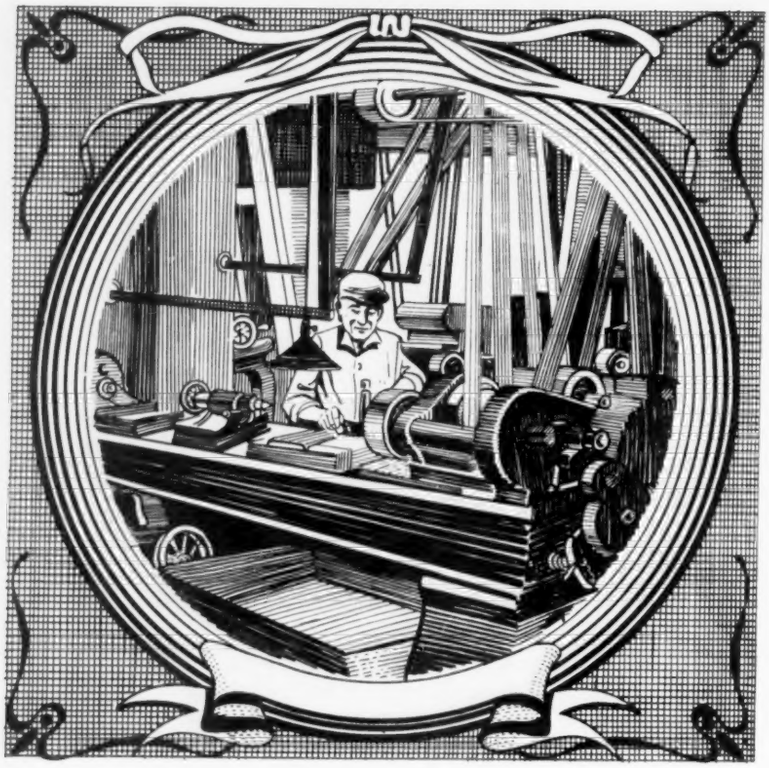
Financial Indicators

	June, 1935	May, 1935	June, 1934
25 Industrial stocks	$161.44	$155.20	$133.14
25 Rail stocks	$25.17	$24.18	$34.38
40 Bonds	$81.33	$80.77	$82.55
Bank clearings (000 omitted)	$20,399,783	$20,740,277	$19,597,012
Commercial paper rate, New York (per cent)	1	1	1
*Commercial loans (000 omitted)	$8,038,000	$7,612,000	$4,485,000
Federal Reserve ratio, per cent	74.4	73.3	69.2
†Railroad earnings	$39,505,068	$34,625,786	$39,699,195
Stock sales, New York stock exchange	22,339,512	30,438,423	16,802,460
Bond sales, par value	$265,093,200	$285,404,900	$267,056,000

*Leading member banks Federal Reserve System.
†May, April and May, respectively.

Commodity Prices

	June, 1935	May, 1935	June, 1934	Monthly Av. 1913
STEEL's composite average of 25 iron and steel prices	$32.42	$32.35	$32.96	$26.32
Bradstreet's index	$9.84	$9.90	$9.23	$9.21
Wheat, cash (bushel)	$1.00	$1.06	$1.12	92c
Corn, cash (bushel)	$1.01	$1.04	73c	51c
Petroleum, crude (Bbl.)		98c	98c	$2.50



EFFECT OF

•• on the

BY GUY HUBBARD

AT THE close of the World war it was rather common belief that the huge surplus of industrial equipment—machine tools in particular—was destined to serve as a reservoir of peace-time manufacturing machinery for years to come. The machine tool industry was considered by many otherwise well informed business men to be just another "war baby" doomed to virtual extinction because of unnatural development during the war. Some machine tool builders shared this view.

They did not foresee that the postwar decade was destined to be a fast moving decade, nor did they take into account that wartime tools—regardless of the numbers built—generally were of the vintage of 1914 or earlier as far as design was concerned. No sooner was the hectic rush of wartime manufacturing at an end, than progressive machine tool builders began to make up for lost time. As a result, depreciation was accelerated tremendously. By 1925, authorities were stating emphatically the majority of the wartime machine tools were obsolete. Manufacturers who did not believe these authorities soon were convinced when they got up against mass production competition with rival plants which had been re-equipped with the new tools.

History has been repeating itself. Gloomy observers have drawn sad pictures of machinery markets glutted for years to come with "boom-time" machine tools of the 1925-1930 vintages, dumped on the market by the industrial collapse. They have told vivid tales of acre upon acre of manufacturing space filled with new machine tools which scarcely have made a turn of their spindles in five years. To those lacking in industrial imagination it does indeed seem to be a deplorable condition. They do not realize that during the boom—as during the war—design improvements lagged. They do not realize revolutionary developments lately have come about in metallurgy, in engineering and in manufacturing technique. They do not realize progressive machine tool builders have developed new machine tools which are just as different from and better than the best of five years ago, as the automobile of 1935 is different from and better than its forebear of 1930. Therefore they do not realize untold thousands of "boom-time" tools, even though unused, today are obsolete and unfit for use in the current era of industrial revival.

Determining Obsolescence

Let us look at this thing called obsolescence, particularly in the light of recent developments in machine tools. What, for instance, are important points to consider in determining the degree of obsolescence of present equipment? With no intention of being dogmatic, and in full realization that circumstances alter cases, here are 14 points which the user of production tools will do well to consider carefully as he contemplates his present equipment in the immediate expectation of increasingly higher levels of output, with tightened limits of accuracy, with a definite scarcity of skilled mechanics and under highly competitive conditions both as to quality and price. These points are:

1. *Cost of reconditioning the old machine as compared with cost of latest model, bearing in mind always the possible end efficiency of the old machine as compared with the new.*
2. *Peak productive output.*
3. *Degree of accuracy at top speed.*
4. *Quality of finish possible at top speed.*
5. *Secondary operations possible.*
6. *Down time.*
7. *Degree of skill demanded of operator.*
8. *Physical strain imposed on operator.*
9. *Physical hazards.*
10. *Mental hazards.*
11. *Power consumption per pound of metal removed.*
12. *Cost of tooling and tool maintenance.*
13. *Versatility.*
14. *Will your chief competitor stick to his old equipment, or will he re-equip his plant?*

Taking these items one by one, let us analyze them and amplify them to some extent.

1. *What of the cost of reconditioning the old machine as compared with the cost of the latest model, and what of the end efficiency of the reconditioned machine?* This question all

RECENT MACHINE TOOL DEVELOPMENTS

ECONOMIC VALUE OF PLANT EQUIPMENT

too frequently is settled arbitrarily and most uneconomically by a budget system which says in effect, "Thousands for repairs, but not one cent for re-equipment!"

Here is a case in point. A manufacturer of turret lathes received an order for a complete new spindle assembly for a small hand screw machine, the manufacture of which had been so long discontinued that repair parts even had not been available for a number of years. Upon being so informed, the user (a company of considerable size) insisted the spindle assembly be furnished, even though it had to be made up special. A price of $500 was quoted, this being at least five times the scrap value of the old machine and over one third the cost of a new machine of latest model. To the amazement of the builder, this quotation was accepted, the purchasing agent explaining that $500 was readily available from the maintenance fund, while nothing was available at that time for new equipment.

What About Reconditioning?

Bear in mind that complete reconditioning of a production machine tool to meet present conditions means far more than merely putting the machine back into something like its original condition. Full reconditioning means giving a machine greatly increased power, higher speeds and heavier feeds, to make it handle effectively the new cutting materials, including tungsten and tantalum carbide, and the new alloys which in all probability will have to be cut.

Will the average machine tool of the "boom-time" era stand the gaff after such drastic reconditioning? The safest answer is "No." Speeds, feeds and power required to meet the demands of the new cutting materials and materials to be cut, are so far beyond what the average machine tool of five to ten years ago was designed (and well designed) to handle, that factors of safety likely will be seriously exceeded in the reconditioned machine. If a general smashup does not occur then breakdowns of this or that unit certainly will occur. The result will be highly unsatisfactory if not dangerous, in nine cases out of ten.

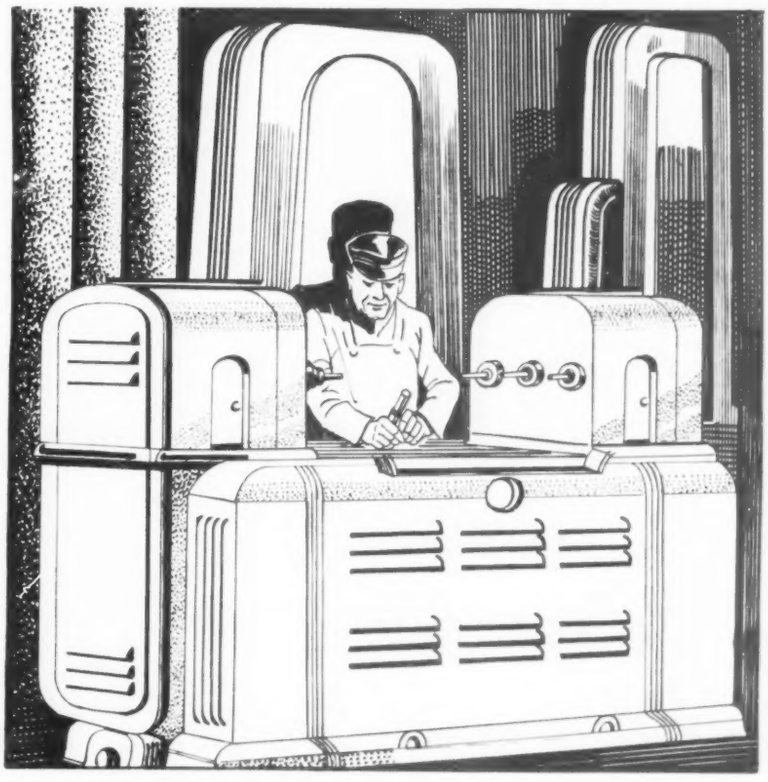
2. *What of the peak output of your old machine as compared with guaranteed output of the latest models?* Think of it this way. In the final analysis, a production machine tool simply is an efficient means for producing a maximum number of parts to specifications in minimum time.

In these days of increasing competition—both domestic and foreign—even the smartest American manufacturer cannot afford the handicap of slow machinery. The most effective way to check the production figures of older equipment against those of the latest models is to get estimates on what the new machine will do. To the uninitiated the new figures—even though guaranteed—will probably appear fantastic, increases of 200 or 300 per cent being by no means uncommon.

3. *What degree of accuracy will your older machines maintain consistently at top speed?* If you are engaged in the mass production of the better grades of mechanisms and parts thereof—including automotive equipment—you are faced with the necessity of holding to limits expressed in tenths of thousandths where limits of thousandths were close enough less than ten years ago. This drastic tightening of working limits has been forced by elimination of "hand fitting" in the assembly of what now truthfully can be called interchangeable mechanisms; by the constantly widening use of prelcaded antifriction bearings; and by the demand for absolutely "shakeless" fits, perfect balance, and silence in commercial mechanisms.

Except under toolroom conditions, it is a fairly safe axiom that no machine tool will reproduce a degree of accuracy which has not actually been "built into it." Jigs, fixtures, gages and other special equipment in everyday use today are comparable to the equipment to be found less than ten years ago only in the "inner sanctums" of makers of fine gages and other instruments of precision. It is no exaggeration to say a modern machine tool plant is a practical physical laboratory equipped and manned to meet today's demands for extreme commercial precision.

4. *What of the quality of finish*



possible on your older equipment, as compared to that attainable on the latest models? This point of course is related to No. 3, accuracy and fine finish generally being complementary to each other. It is true that fine finish always has been possible (not necessarily with accuracy, however) on machine tools of the older vintages, if productive speed was sacrificed. Today, such sacrifice cannot be tolerated. Fine finish (again not necessarily with accuracy) also has been possible by means of secondary operations—lapping or polishing of turned or ground surfaces, for instance. The tendency today is away from secondary operations, because they invariably slow down production and increase cost.

Astounding an Expert

A good example of what the latest production machine tools will do in the way of producing fine finish in the regular course of their operation was cited by a well known authority on grinding machines, upon his return from the Olympic Machine Tool exhibition held in London in November, 1934. Desiring a demonstration of a heavy-duty grinder, which incidentally was of American design, he handed to the operator—just an ordinary grinder hand—a test piece on which he specified limits and finish to a degree which he believed would be beyond the possibilities of this machine. The operator accepted the task with no sign of surprise, mounted the work without any undue care, flipped the control levers in an entirely casual manner, made *a single pass* over the work with what appeared to be an ordinary abrasive wheel operating at commercial speed and feed, and then handed back the test piece—not only well within the prescribed limits of accuracy but also with a finish ordinarily associated with the lapping process.

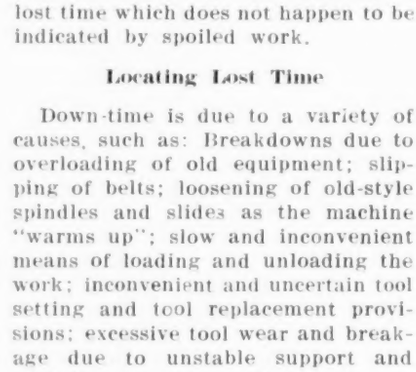
5. *Are so-called "secondary operations" profitably possible on the older equipment, to the extent that they are on the new models?* In analyzing point No. 4, we already have touched upon this in citing the complete elimination of a secondary operation, which is an ideal condition. While complete elimination is not always possible, it is possible on the latest machines to perform what formerly were secondary operations, without resetting the work and during the same time that the primary operations are being performed. This eliminates all of the time and most of the cost of these secondary operations.

Take for example some of the latest multiple-spindle automatic screw machines having built-in provisions for the mounting and driving of attachments which will perform cross drilling, slotting and milling operations on complicated parts which at other stations in the machine are being given the regular turning, forming, drilling, boring and threading operations ordinarily associated with this type of machine. The result of this combining of primary and secondary functions is that completely finished pieces are "dropped off" these new machines at least as fast and probably a great deal faster than semifinished pieces can be produced on the older machines which can be tooled up only for the primary operations.

6. *What of the down-time of older machines as compared with the latest models?* Here we are dealing with what has been called "industry's huge invisible scrap pile," made up of accumulated nonproductive time both of men and of machines—the two being intimately related in our highly mechanized industrial system. Time studies and various time-production metering and recording instruments have done something toward making industrialists more conscious of the evils of nonproductive time than they used to be. Nevertheless, to most of them even a small pile of spoiled work—which after all is nothing more than a mixture of a relatively small amount of ruined material with a large amount of wasted time—still continues to be more impressive than a far greater amount of lost time which does not happen to be indicated by spoiled work.

Locating Lost Time

Down-time is due to a variety of causes, such as: Breakdowns due to overloading of old equipment; slipping of belts; loosening of old-style spindles and slides as the machine "warms up"; slow and inconvenient means of loading and unloading the work; inconvenient and uncertain tool setting and tool replacement provisions; excessive tool wear and breakage due to unstable support and periodic vibrations; slow return of slides, slow feeding of stock, and slow indexing of turret or station-to-station mechanisms; inconvenient and uncertain means of control; poor provisions for the accumulation of chips and work within the machine and for their ready removal while the machine is in operation; ineffective lubricant and coolant systems, causing "frozen" bearings and burned tools; and destructive vibration and pounding induced by poorly designed revolving elements and reciprocating mechanisms.



When studying old equipment in the light of engineering advances embodied in new models, bear in mind that as the old equipment grows older its down-time normally will increase in an arithmetical ratio to its age, which will change to a geometrical ratio if attempts be made abnormally to force the aging equipment to meet the competition of new machines.

7. *What of the degree of skill demanded of the operator of an older model machine, as compared with the latest model?* In this is involved the basic theory of mechanized production, which is that skill and a form of intelligence actually are transferred to production machine tools by their designers and builders, and the tool designers, toolmakers and set-up men who equip them for action. The transferred skill and intelligence of these engineers and mechanics then is multiplied by the number of the machines built. Through this transfer and multiplication, ordinary machine operators are enabled to produce parts which would tax the ingenuity of the most skillful mechanic working without the help of machinery.

Shortage Was Foreseen

Less than two years ago, in the midst of the NRA turmoil in Washington with its schemes for increasing employment by limiting the use of production machinery, Prof. Joseph W. Roe, an authority on the development of the machine tool industry, predicted to the writer that within two years there would be a scarcity of skilled mechanical men who at that time were walking the streets looking for work. Today, machine tool builders are looking for such men and they are increasingly hard to find. An old machine tool which demands more than its share of attention on the part of a thinly spread supervisory staff, is an economically unsound unit and should be replaced. The latest machine tools have built into them a higher degree of skill and intelligence than ever before. Modern equipment therefore is one of the most effective answers to the growing problem of the scarcity of first class mechanics.

8. *What of the physical strain imposed on the operator by an old style machine, as compared with the latest model?* As in the case of No. 7 this is a point of vital importance in these days when good mechanics are becoming scarce. Machine tools are supposed to be labor-aiding and labor-saving machines. Their value in

this respect is directly proportional to the amount of physical strain of which they relieve the operator.

Many of the older machine tools were designed with little or no regard for the physical characteristics of the average operator. Loading and unloading involved heavy lifting and violent work with wrenches. Control involved the pushing and pulling of stiff working levers, handles and knobs located here, there and everywhere, from the belt shipper overhead to some obscure thing behind or beneath the machine. With machines like that in a plant, operators are worn out long before the day is over—not by the pressure of productive work but by needless physical strain, lost motion and unnatural working posture, all due to faulty machine design.

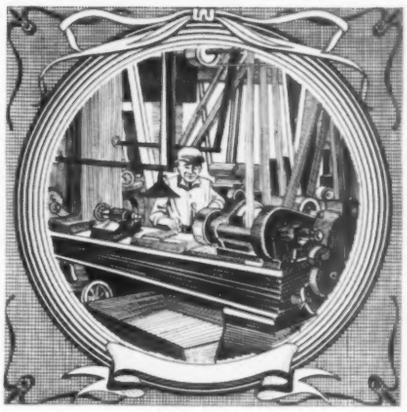
Easing Operator's Task

With the latest model machine tools there is an entirely different state of affairs. Power is applied wherever possible to relieve the operator of heavy pushing, pulling and lifting. Controls have been centralized at logical operating points and in many cases a neat row of push-buttons has replaced the widely scattered levers. Work and tools are so located as to be most accessible to the operator. In other words, the machine is designed to fit the man.

9. *What of the physical hazards of the old machine as compared with the latest model?* Many of the older model machine tools should have lettered upon them the words, "Let the operator beware!" While there is no such thing as an absolutely foolproof machine tool, the smartest operator sooner or later is bound to be caught off his guard by such diabolical things as unguarded gear trains, whirling shafts with protruding set-screws, hand cranks which spin if power is applied at the wrong moment, cone pulleys on which heavy belts have to be thrown from step to step by hand, vital controls which are difficult to reach in an emergency and which act slowly even if reached, and a general lack of safety devices of any kind.

No operator can do his best on a machine of which he constantly is in fear, and, aside from the humanitarian angle, an unsafe tool is a decidedly poor investment from the production angle. In the latest machine tools careful attention has been given to the matter of safety, not only for the protection of the operator but for protection of the machine as well.

10. *What of the mental hazards of an old machine as compared to the latest models?* This already has been touched upon under the previous heading, when it was remarked that no operator can do his best on a machine of which he constantly is in fear. Actually there are two kinds



of "fear of the machine"—one being fear of its physical dangers, the other a lack of confidence in its mechanical reliability. Both are mental hazards common to operators of the older machine tools, and both lead to retarded production and spoiled work.

New model machine tools have been designed to eliminate mental hazards, and they look the part. A glance at them inspires a feeling of confidence in their safety and reliability. This confidence is warranted by numerous features such as quick change gearboxes which do away with computations as to speeds, feeds and in screw cutting, graduated dials which give correct readings to split-thousandths, and in the case of grinding machines, gaging devices which dress the wheels and size the work automatically.

11. *What of power consumption per pound of metal removed by old machines, as compared with the new?* At first thought it seems fortunate that power happens to be one of the least expensive commodities used in metalworking plants. Otherwise, the fact that many new production tools employ motors of 50 horsepower while older models were equipped with 20-horsepower motors, might lead to additional sales resistance on the part of those who are inclined to cling to outmoded machine tools.

Power Cost Really Lower

After all, when a machine actually will turn out from two to four times as much work, and better work, than an older model—this in a given period of time—it is natural that the power consumption should be higher. The cost of this extra power is a small price to pay for the greatly increased output.

While the amount of power required per pound of metal removed varies widely with the type of machine, nature of tools and work, and nature of the material machined, it is a fact that in most of the new machine tools the power cost per pound of chips is substantially lower than on previous models. Antifriction bearings and improved lubrication systems have reduced friction losses in the machine, peak loads have been reduced by smoother indexing and by the flywheel effect of increased speeds, and cutting tool friction has been greatly reduced by scientific tool design.

The fact that an old time shop employing 500 men got along with a 100-horsepower engine, while a modern shop of the same size may require 500 horsepower, merely is an indication that each workman is getting the benefit of five times as much mechanical power as his less fortunate predecessor, and thereby—with the help of modern equipment—is enabled to turn out infinitely more and better work.

12. *What of the cost of tooling maintenance on an old machine, as compared with the latest model?* The immediate answer is that the initial cost of tools for the new machine probably will be much more than for the old, especially if cemented carbide and multiple tooling to split long operations are involved. However, if the cost of the tools per piece of work produced, and the quality of that work are taken into consideration, the end cost of the tooling for the new machine will be found much less than for the old.

Maintenance Less Costly

As far as tool maintenance is concerned, the apparent cost in the case of the new machine also may be higher, but analysis will prove that the end cost, which is the true cost, is infinitely lower. Naturally it does cost more to grind a complicated set of multiple tools, especially formed tools, and it costs more to grind cemented carbide tools, but the total life of these tools on the new machines and their life between grinds is from two to five times that of tools on the older machines.

The user of old-style tools who attempts to increase their production by the application of cemented carbide is apt to discover one of two unpleasant things if he is not content with moderate gains. Either he will be unable to speed up his machines to get the full benefit of the new cutting materials, or he will wreck his expensive tools and possibly his machines as well, if he does overspeed them. The fact should not be lost sight of that one reason why machine tools lately have had to be completely redesigned, has been to meet the requirements of the new cutting materials.

13. *What of the versatility of an old model machine, as compared with the latest type?* Views on this question will depend upon the design stability of the product. If a manufacturer expects to go on making one particular piece throughout the entire life of a machine tool, then versatility is

(*Please turn to Page 50*)

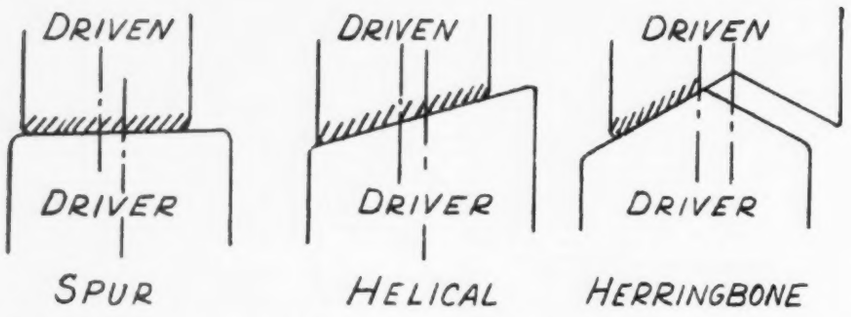


Fig. 1—This illustrates the effective load carrying face of each of the three best known types of gearing when face centers are not exactly in line

Selecting Gearing for Cranes For Steel Mill Service

BY S. L. CRAWSHAW
Westinghouse Electric & Mfg. Co.

STEEL mills—to any equipment supplier these two words are synonymous with heavy loads, extra factor of safety, dependability and ruggedness. Here, the demands made of a crane, both as to capacity and speed, reach the maximum.

The application of gearing to cranes always has been studied with safety as the objective. Because of the elevated mounting of this equipment, ample means of protection must be provided for the ground level workman as well as the crane operator. Steel mill crane gearing, therefore, should be considered from a strength standpoint with the idea of obtaining maximum safety combined with compactness of design. The result of this practice is the most economical use of materials.

Determining Best Type

The first step in selecting gears is to determine the type of gearing. In the cause of simplicity and compactness, it is recommended that the gearing be made single helical or straight spur, depending upon the bearing design and arrangement. These two types provide full face contact without the necessity of placing the face centers in alignment.

Fig. 1, illustrates the effective load carrying face of the three prominent types of gearing when the face centers are not exactly in line. It is to be noted that in the case of spurs or helicals, the face of the driver is made slightly wider than that of the driven, thus insuring 100 per cent face contact regardless of axial alignment.

Another consideration in favor of the spur or helical type of gearing is reduced impact loads. The reversing service encountered makes impact loading unavoidable; however, it can be minimized by recognizing two fundamentals. First, the effective travel varies as the cosine of the helix angle. Fig. 3 shows this simple trigonometric function which applies to helical or herringbone gearing. This factor naturally is independent of the type of manufacture. The second factor is a result of the first and will be recognized as a fundamental law of physics, that is, "impact varies as the square of the distance traveled."

Since backlash is a necessity to provide an oil film space and as shown in Fig. 3 the helix angle increases the effective travel, it follows logically that the steeper the helix, the greater will be the impact loading. Fig. 2 charts the effective travel and resultant impact against helix angle.

With the embodiment of antifriction bearing construction in the modern crane design, proper maintenance of gear centers and parallelism of shafting is insured. Use of single helical or spur gearing eliminates the necessity of axial adjustment; thus gear maintenance problems are reduced to a minimum. With this improvement in alignment insurance, it is recommended that the gearing be designed with full depth teeth of long and short addendum proportions and a minimum pressure angle of 20 degrees.

LITTLE information having been published on gearing for steel mill cranes, the engineering department of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has prepared its own set of standards. The accompanying article is based on these standards. The author, S. L. Crawshaw, is application engineer, associated with the company's Nuttall Works.

Recommended Heat Treatment

Wherever possible, forged steel should be used whether pinions from hammer forged blanks, gears from rolled steel sections, or gear rims of rolled forged type. Where castings are unavoidable they should be of 0.35-0.45 per cent carbon thoroughly normalized. The following heat treatments are recommended:

1. All motor pinions should be normalized and heat treated.
2. All other pinions should be normalized, heat treated and hardened.
3. All motor gears should be thoroughly normalized and heat treated.
4. All other gears whether forgings or castings should be normalized, heat treated and hardened.

It will be noted that groups 1 and 3 are not recommended for hardening. This is done to minimize vibration as they are the higher speed items. For these groups the hardness is dropped to the point where finish machining can be accomplished after heat treatment.

For the hardened group a combination is recommended to give maximum wear with maximum shock resisting qualities. To obtain this desired result it is necessary to avoid the extremely high hardnesses which result in shallow case depths and brittleness.

With control of the material and treatment, the physical properties shown in Table I are estimated for

Table I

Estimated Physical Properties of Gear Teeth

Material	Surface hardness, brinell	Tensile Strength, pounds per square inch	Yield Point, pounds per square inch
Heat treated pinion	241±10	118,000—125,000	91,000—98,500
Heat treated gears	220±10	113,000—117,500	87,000—91,000
Heat treated castings	220±10	112,000—117,000	65,000—75,000
Hardened pinions	475±20	220,000—245,000	195,000—220,000
Hardened gears	430±20	205,000—220,000	180,000—195,000
Hardened castings	400±20	180,000—210,000	155,000—180,000

the surface structure of the gear teeth.

Evidence as to the toughness of the structure can be had from the recommended values of Table II, these values being obtainable in 1-inch diameter coupon test specimens. It will be noted that the hardness recommended varies with the material and application. This has been done to compensate for greater pinion wear and to obtain greater strength.

It is further recommended that purchasers of steel mill crane gearing use the following specifications regarding tolerances in the interests of greater safety:

Parallelism of Tooth Face with Axis

	Inches
Heat treated gears and pinions	within 0.003
Hardened gears and pinions	within 0.004

Pitch Line Eccentricity

	Inches
Motor pinions	max. 0.006
Heat treated gears, hardened pinions	0.010
Hardened solid gears	0.015
Hardened ring gears	0.020

Backlash

Diametral pitch	Inches Min.	Max.
5	0.006	0.012
4	0.007	0.014
3	0.010	0.020
2½	0.012	0.024
2	0.014	0.028
1½	0.021	0.042

It is recognized that the gearing item represents a small portion of the problem of building an efficient, sturdy crane; however, the gears play a definite part in its mechanical strength and rating. Every design has its own peculiar problems so that while the information given in this article covers good gearing practice, it can be applied best by co-operation between the operator, crane builder and gear manufacturer.

Metal Failures Not Caused By Crystallization

The common belief that so-called crystallization in metals under vibration has been responsible for many failures, as in the widely publicized report of a recent airplane endurance flight, where crystallization in the metal was said to be feared by the aviators and given as their reason for landing, has been contradicted by experts of the national bureau of standards, Washington.

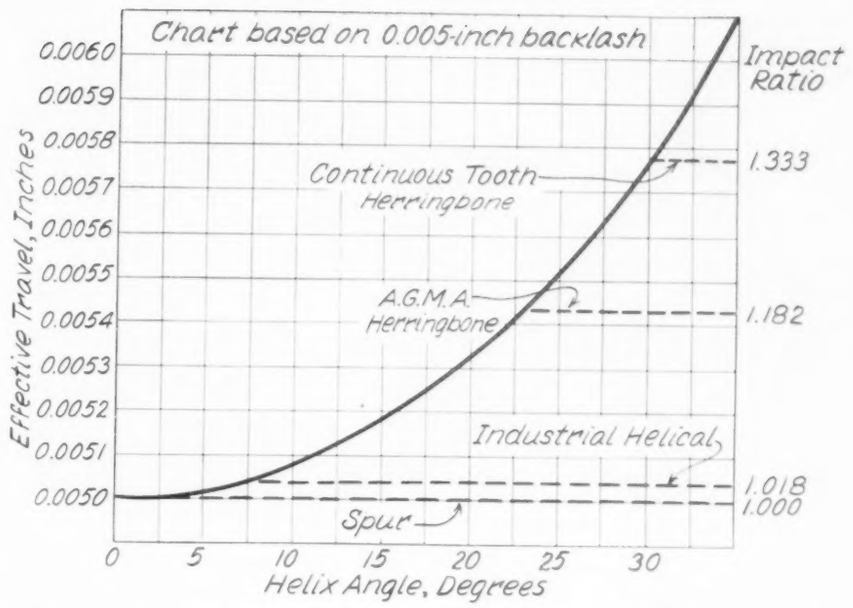


Fig. 2—This chart shows the effect of helix angle on actual travel and impact

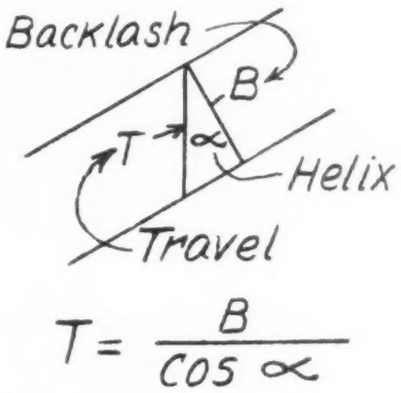


Fig. 3—Effective travel varies as the cosine of the helix angle; this applies to both helical and herringbone gearing

The crystalline appearance of a broken piece of metal, it is pointed out, has been responsible for this erroneous belief. However, in reality these surfaces are merely a normal structure of the metal through which it has cracked, as all metals in their solid state are aggregates of crystalline grains.

In metals of the ductile type, such as steel, the break is much more gradual and the small crystalline portion is the last part to break.

Discusses Rolling Practice

Numerous phases involved in the rolling of black plate for tinning are discussed by J. Selwyn Caswell, lecturer in engineering, University college, Swansea, Wales, in a paper entitled, "Some Rolling Characteristics in the Production of Blackplate," and recently presented before the Swansea technical college metallurgical society. The author directs attention to some of the finer points associated with the plant, rolled stock and the system of rolling. By means of formulas the values of factors affecting thickness and the maximum values of roll deflections are determined. Eleven illustrations are included. Copies of the 40-page booklet may be obtained from the Technical College, Swansea, Wales.

Table II

Recommended Toughness for Gear Teeth

Material	Surface hardness, brinell	Coupon Test Physical Properties — Tensile strength, pounds per square inch	Elastic limit, pounds per square inch	Elongation, per cent	Reduction of area, per cent	Izod impact, foot-pounds
Heat treated pinions	241±10	115,000—125,000	70,000—80,000	24—18	55—45	32—26
Heat treated forged gears	220±10	115,000—125,000	70,000—80,000	24—18	55—45	30—15
Heat treated cast gears	220±10	112,000—122,000	50,000—60,000	15—7	20—12	15—8
Hardened pinions	475±20	135,000—155,000	85,000—100,000	22—17	47—38	30—26
Hardened forged gears	430±20	135,000—155,000	85,000—100,000	22—17	47—38	32—28
Hardened cast gears	400±20	115,000—140,000	65,000—80,000	22—13	47—30	20—10

METHODS AND MATERIALS

Develops Copper Alloy Of Unusual Properties

A material of high electrical conductivity, great mechanical strength and greatly diversified application, has been developed by the metallurgical engineering department of P. R. Mallory & Co. Inc., Indianapolis. Designated as Mallory 3 Metal, the material is an alloy consisting predominantly of copper and is said to be the equal of copper in coefficient of resistivity, coefficient of expansion, modulus of elasticity and corrosion resistance.

Electrical conductivity of forgings and rods made from the alloy is rated at 80 to 85 per cent, or better, that of copper. Sand castings will have an electrical conductivity of 75 to 85 per cent that of forged copper. Physical properties of the new alloy are claimed to be equally as interesting when compared with those of copper, brass, bronze and steel.

It is stated that the material may be substituted, with few exceptions, for brass, copper, bronze, or even structural steel. Already, it has been used extensively for spot welding tips, flash welding dies and seam welding wheels. Castings have proved remarkably successful in numerous applications where material of high strength and high conductivity is required.

Because of its high electrical conductivity and strength equal to that of mild steel, the metal may be used to replace bulkier copper parts, effecting a saving in weight and size. It can also be used as scoreless commutator segments in motors and generators; and overhead wire for electric railways, telephone and telegraph service, as its great strength will resist breakage from sleet and wind.

Its high heat conductivity will permit its use under heat conditions where copper softens, such as welding wheels and tips, and hot water coils. As welding tips and wheels, its use is said to be successful where proper water cooling is not obtainable. The alloy may also be had in high - conductivity, high - strength castings.

S S S

The Stylist Meets Steel Furniture

This new steel furniture, manufactured by the Howell Co., Geneva, Ill., was designed by Clement Thelander, industrial stylist, Rockford, Ill. The spring steel chair is chromium plated, with upholstery in blue Fabrikoid. Desk and table are finished in black and chromium plating

Ravioli Making Machines Use Considerable Metal

Ravioli, that famous Italian dish known in many parts of the world, makes its due demands on iron and steel. A special dough with a special stuffing, ravioli, in professional baking, requires a particular type of equipment, comprising the so-called dough brake and the ravioli machine proper. One model of this latter machine, sold by the Aurelio Tanzi Engineering Co., 235 Fourth avenue, New York, weighs approximately 155 pounds, of which 90 to 95 per cent is iron and steel. The machine is 28 inches in height.

The largest single ferrous item is cast iron, which goes into the base and frame of the machine and also into larger gears. Of the iron and steel required, possibly 85 per cent is cast iron. Shafts and pinions are of machine steel, and a cylinder, which holds the stuffing, either

stainless steel or aluminum. Spools, on which the dough is wound, are of brass. Certain parts are nickel plated.

By turning a crank, the dough and stuffing are automatically fed through the machine, with the ravioli thus filled and cut ready for the market.

The dough brake machine, is also constructed largely of cast iron, with the shaftings of steel, the bearings of special alloy and the rolls of cast iron, brass and aluminum. In this machine, the dough is worked into sheets until it is uniformly kneaded to the required thickness.

S S S

Improves Sewing Machine Parts by Grinding

A manufacturer of sewing machines has reduced his costs by installing a hand-feed type of internal grinder for grinding the diameter and bottom of a counterbore in rotating hooks. The part is held accurately in a magnetic chuck which offers a simple and quick arrangement for handling the work. The improved finish and accuracy of the ground surfaces has afforded better lubrication because of improved alignment and uniform clearance between component parts and thereby permitted increasing the speed of this part about 1000 revolutions per minute.

S S S

Finds Calcium Addition To Have Beneficial Effect

Addition of calcium so that 0.1 to 1.0 per cent is retained in nickel-copper, and in nickel-copper-silicon alloys, has an extremely beneficial effect, according to a recent patent. It increases fluidity, refines grain, minimizes red shortness, provides age hardening and reduces shrinkage.

In an alloy containing 1.75 to 3.25 per cent silicon with the remainder comprised of nickel and copper in equal amounts, it may be quenched in water, air or oil from 1350 to 1600 degrees Fahr. without cracking, so that it may be machined, and after aging for 8 hours at 900 to 1200 degrees Fahr., the original hardness or better is obtained.

S S S

Gives Heat Treatment for Aluminum Alloy Castings

An aluminum alloy containing from 3.5 to 4.5 per cent copper, 1 per cent iron maximum, 1.8 to 2.3 per cent nickel, 0.7 per cent silicon maximum, 1.2 to 1.7 per cent magnesium, 0.3 per cent manganese maximum, 0.1 per cent zinc maximum, may be heat treated as follows: Heat the castings at a temperature of 930 to 970 degrees Fahr. for 6 hours in the case of small castings, longer in the case of large castings, and follow by quenching in boiling water.

Aging is completed in 5 days if left at room temperature or by allowing the casting to remain in boiling water, aging will be completed in 2 hours. With sand castings, this should give a metal with over 33,000 pounds per square inch tensile and a brinell hardness of about 100.

S S S

Steel Company Truck Uses Stainless Nameplates

Stainless steel finds wide use as material for nameplates, but an application made by one of the oldest steel companies in Sheffield, England, constitutes a novel variation. A motor truck used by this compay for trasporting iron and steel bars has seven 18-gage stainless steel plates, 2 feet 9 inches long and 7 inches high, attached to each side. These plates, which have a bright polish, are painted with the name of the company in blue lettering outlined in red, which appears extremely attractive on the silvery surface of the steel. The lettering was painted on in the usual way. The plates are slotted into steel angle supports along the side of the truck bed and bolts passing through the angles attach the plates to the bed.

S S S

Processes Invar Tape for Accurate Surveying Work

In its issue of July 8, page 42, STEEL published an item, "Nickel Steel Tape Permits More Accurate Surveying," dealing with the extremely accurate Invar tape which now is being used to maintain the boundary line between the United States and Canada. This article, reprinted from the June issue of *Nickel Steel Topics* published by the International Nickel Co. Inc., New York, may have created the erroneous impression that the tape was supplied by this company.

As a matter of fact, the tape was heat treated and processed by the Driver-Harris Co., Harrison, N. J., to give minimum coefficient of expansion and was furnished by this company to the geodetic survey. It is generally known, of course, that the International Nickel Co. does not produce Invar and similar alloys, neither does it manufacture sheet or strip in any metals except pure nickel and monel.

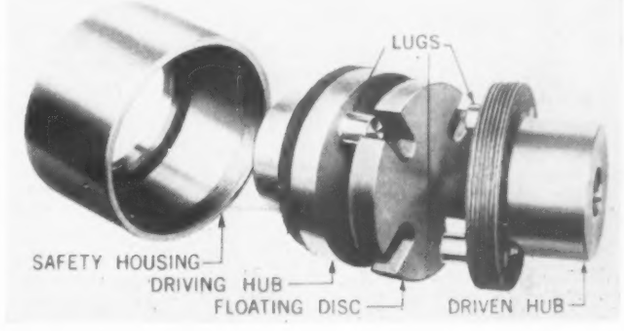
Coupling Adjusts Itself to Both Parallel and Angular Misalignment

A SELF-ALIGNING coupling for use in direct connected drives has been developed by the Alloy Products Corp., Waukesha, Wis. It is self adjusting so as to compensate for parallel as well as angular misalignment.

In tests the new couplings have operated satisfactorily with parallel misalignment of as much as 5/16-inch and with angular misalignment of 3 to 6 degrees. They may be used at any speed. A typical example of many applications is on a 10-horsepower motor drive operating at 5600 revolutions per minute.

The new coupling plays the part of a safety valve between the motor and drive bearings and its use is said to eliminate the necessity for shimming in order to obtain and maintain accurate alignments. It operates noiselessly and is said to reduce power losses.

Development of the new coupling is the result of the company's experience in building stainless steel equipment for the dairy, food, packing, canning, brewery, chemical and other industries. With most of this equipment agitator motor drives or circulating pump units with direct connected motors are employed. Considerable difficulty was encountered



Use of this coupling is said to eliminate necessity for shimming in obtaining and maintaining alignment. It adjusts itself both to parallel and angular misalignment

in lining up this equipment due to the fact that the tanks expand and contract in operation, thus disturbing the alignment.

The new coupling was found to compensate for misalignment much greater than that occurring from ordinary expansion and contraction. In fact, the company reports that some of these couplings actually are running on sprung shafts, thus reflecting the possibilities for saving both motor and adjacent bearings.

The new coupling, as shown in the illustration on Page 33, is made in four parts. Two of them are driving hubs into whose faces round lugs are set, two in each hub. When assembled, the lugs fit in recesses in the periphery of the third part, a drive disk made of bone fiber. These recesses are made long so as to permit the lugs to slide in them; it is this self adjusting feature which permits the coupling to operate satisfactorily despite the existence of misalignment.

While the coupling will operate satisfactorily at any degree of misalignment within its limits, centrifugal action tends to make it self aligning as the bone fiber disk has a tendency to float, thereby finding its own center. The fourth part is a cover housing which acts as a guard.

The new couplings are long lived; they reveal no measurable wear after having been in continuous operation for two years.

Rustproofs Lamps With New Process

A NEW method of rustproofing utilizing alternating current has been perfected by the Ford Motor Co. and now is being used in its entire production of headlamps and tail lamps at its lamp plant at Flat Rock, Mich.

The new process is considered by Ford chemists as especially suitable for use in the Flat Rock operation, as it requires less room than other methods of rustproofing, and provides a surface which is ready for painting as it comes from the rustproofing machine. The only attention required before painting is to wipe off the surfaces to be painted with a clean cloth.

Phosphate Coating Applied

The process was developed first outside the Ford organization, but when it was given its first commercial tryout in the Flat Rock plant a number of difficulties developed. The most important of these was deterioration of the steel surface by acid action before the deposition of the rustproofing agent, zinc phosphate, began.

This finally was overcome by discontinuing the elaborate washing operation which preceded the actual rustproofing. Instead of washing the lamp shells in a machine, they are made dirty instead by wiping the surface to be painted with a cloth impregnated with low-grade gasoline. This puts an oily film on the surface and by the time the chemical action in the rustproofing machine has removed this film the deposition of zinc is well under way and the desired smooth finish is obtained.

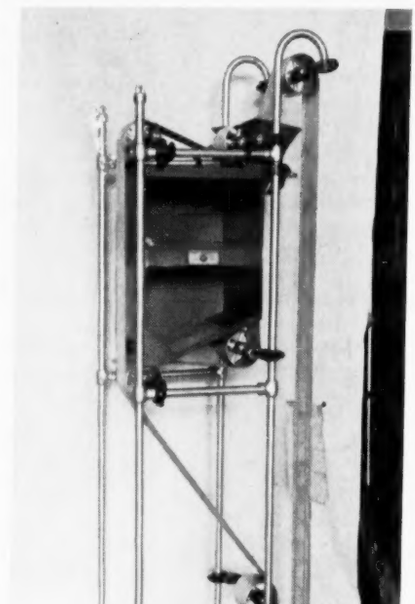
The rustproofing machine, or rather machines, for two units are in use, are entirely automatic. The burnished lamp shell, with its oily film is hung on a conveyor which carries it into the bath, where it stays for 4½ minutes. The bath is kept at 155 degrees Fahr., and an alternating current of 20 volts, pulling from 35 to 50 amperes at 60 cycles, alternately makes the article to be rustproofed an anode and then a cathode.

After 4½ minutes in the bath, the rustproofed articles are taken by conveyor to a hot water spray rinse and dip rinse, and then to the paint booth, where they are dip painted at once after being wiped off with a clean cloth.

A feature of the process is that the proportion of metallic zinc in the bath can vary widely and still permit satisfactory results. It is allowed to vary from 0.9 per cent to 0.2 per cent.

The process is not thought to be suitable for large pieces, such as fenders, because the oily-wiping operation by hand is probably not economically feasible for very large articles. Rustproofing methods previously used, therefore, are being continued for large surfaces.

Mechanical Office Boy



THIS MOTOR-DRIVEN BELT CONVEYOR for carrying orders, work sheets, requisitions or other printed matter between various departments of plants, warehouses, retail stores, etc., has just been introduced by the Baldwin Carrier Co., 30 South Clinton street, Chicago. Unlike the pneumatic tube, this carrier requires no container for holding the material to be transmitted. Sheets are gripped between two belts of canvas webbing, 3½ inches wide, until moved to the discharge chamber where the belts separate, automatically dropping the papers into a tray. To return the sheets to the other station it is necessary only to slip them into the lower chute, below which the two belts again come together. Here they are picked up and carried to their destination, being deposited there automatically. A counterweight takes up any slack in the belts due to stretching. Pulleys employ antifriction bearings. Travel may be in either a vertical or horizontal direction and for whatever distance is necessary. For a travel of 65 to 75 feet, a 1/3-horsepower motor is sufficient to operate the carrier

Plans for Metal Congress Mature

LEADERS in the metal world will take an active part in the technical program for the seventeenth National Metal congress and exposition to be held in Chicago, Sept. 30-Oct. 4. This is indicated by the almost completed programs of the five co-operating societies.

The societies participating in the 1935 congress are the American Society for Metals, American Welding society, the Wire association, and the Institute of Metals and Iron and Steel divisions of the American Institute of Mining and Metallurgical Engineers.

In the course of some 40 morning and afternoon sessions during the five-day period, more than 75 papers dealing with various phases of the metal industry will be presented. Some sessions will be devoted strictly to research and others with practical shop problems, service tests of materials, melting practice, tool steels and alloys. The program is being so arranged that visitors can attend all sessions in which they are particularly interested.

Headquarters for the congress will be maintained at the Palmer House, where morning sessions will be conducted. Afternoon sessions will be held at the new International Amphitheater, where the exposition will be located.

According to W. H. Eisenman, managing director of the exposition

and secretary of the American Society for Metals, 7016 Euclid avenue, Cleveland, this year's exposition has already far outstripped the 1934 show in New York and promises to be the largest in over five years. About 25 per cent more space has been reserved at this time than at the opening of last year's exposition. The entire space in the Amphitheater, more than 164,000 square feet, will be devoted to exhibits.

Over 160 exhibitors have reserved space, these including steel manufacturers, nonferrous metal producers, and companies building machines and offering processes used in the metal industry.

Program of Wire Association

The Wire association, through its secretary, R. E. Brown, 17 East Forty-second street, New York, has announced the tentative program for its annual meeting to be held in connection with the National Metal congress and exposition. Headquarters will be at the Congress hotel. The annual business session will be held on Monday afternoon, Sept. 30, and the informal dinner will be served on Wednesday evening, Oct. 2, at which time the Wire association medal will be awarded.

Technical sessions will be held on Tuesday, Wednesday and Thursday, Oct. 1-3. For the first time, one entire session will be devoted to open discussions of the joint problems of users of wire and the manufacturers of wire. The association will hold a special meeting with the Braiding and Wire Covering Machine Manufacturers' association.

The following papers have been announced for presentation and discussion at the various technical sessions:

"Acid Cleaning and Material Handling or Rods and Wire," by Frederick A. Westphal, superintendent of wire mill, Sheffield Steel Co., Kansas City, Mo.

"Grain Size and Its Influence on the Manufacture of Steel Wire," by B. L. McCarthy, metallurgist, Wickwire-Spencer Steel Co., Buffalo.

"Industrial Relations as Applied to the Wire Industry," by E. W. Kempton, director of industrial relations, American Steel & Wire Co., Cleveland.

"Cold Heading Wire," by L. D. Seymour, metallurgist, Youngstown Sheet & Tube Co., Youngstown, O.

"Tests and Testing," by C. A. Kellogg, metallurgist, Continental Steel Corp., Kokomo, Ind.

"Modern Acid Handling Methods Lower Pickling Costs," by J. R. Hoover, assistant manager, chemical sales division, B. F. Goodrich Co., Akron, O.

"Effect of Grain Size on Physical Properties of Copper in Drawing and Annealing," by Dr. L. B. Barker, metallographer, and A. E. Bailey, in charge of testing laboratory, General Electric Co, Schenectady, N. Y.

"Hard and Soft Copper Wire," by Rudolph A. Schatzel, superintendent, general research laboratories, General Cable Corp., Rome, N. Y.

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Sound Foundations

THE world needs me." "My job is important." Give a man those two affirmative convictions and he becomes socially adjusted and economically productive. An industrial organization can reach the point of diminishing returns with only 50 employees if this fundamental and basic psychological necessity goes unrecognized.

Labor upheavals, the cruel insanities of "office politics," failure of an organization to function on account of "buck passing"; these are the end products of a management policy which fails to deal adequately with the necessities of the human mind.

When a machine is installed, we design a foundation that meets the necessities of that particular machine. Without a proper foundation, the machine will not produce satisfactorily or last long. That one machine may fail and throw the whole productive mechanism out of harmony. Hiring a man and putting him to work without proper psychological foundations can do fatal damage to an enterprise. These are manifestations of natural law with which successful managers are accustomed to deal. It is the fools and grabbers who have to be restrained by punishing statutory laws.

Was It Justified?

Contrary to the belief of many, the consulting engineering job is usually one of making decisions and taking responsibility when there is no clean-cut course marked out by known facts.

A recent case we had illustrates the point. About 75 structures of a certain type had been built. None had ever failed. Yet there was a weak point in the structure where the factor of safety could not have been more than 2. The question was whether to spend a reasonable amount of money on welding to bring the factor of safety at this point up to about 5 or to stand on the record of successful performance.

In view of the fact failure would result in loss of life and property damage of considerable amount our judgment held the extra expenditure to be justified.

Warpage

A large firm of structural steel fabricators recently took a contract for about 500 tons of welded construction for canal locks. The designers put the assembly together as if it were to be riveted. Net result was that it cost more to straighten the parts than it did to fabricate them. Elimination of trouble due to warpage should start on the drafting board and continue through the establishment of the welding procedure and sequence.

Sparks and Flashes

Last month we had a bright idea on welding. The only difficulty we could find was that another fellow got a patent on the same idea in 1924. This week we got another original solution to a client's welding problem. The search report has not come back on that one yet. If you make a living by dealing with new ideas, you have to take a chance that some other inventor thought of your smart idea long before you did.

* * *

To the manufacturing expert, a locomotive, an automobile, or a refrigerator, is just so many pieces of metal of predetermined shape fastened together. The revolution in manufacturing methods brought about by improvements in the eleven different welding processes is due to the fact that fastening pieces of metal together is the basis of all industries which fabricate metal.

To Buy or Not To Buy?

"If you want to share in the recovery, you must.

"If you are in a bad competitive situation, you should.

"If you hope for profits, or more profits, you can.

"If you want a good return on investment, you will.

"Everyone who can, must; for those who do will get the larger share of the improvement in business."

BY HARRY S. ROBINSON
Secretary, Cincinnati Shaper Co.
Cincinnati

THE manufacturer today who cannot "deliver the goods" is in a predicament. We are not referring to the time element of delivery, but to the satisfying of the buyers' requirements. That man must put his house in order or he cannot hope to participate in the recovery. The depression is over only for those who have renewed their hopes, their efforts, their product and—their equipment.

Aggressive Management

Reference to the statistics of one prominent industry proves the point. With a constantly increasing index of orders since early 1933 for the 200 contributing members, the group operating at high capacity is growing; and at the same time the number of companies with the lowest percentage of operation is also increasing. The middle group is being shifted either to the higher or to the lower brackets not because business is better or worse, but in keeping with aggressiveness of management.

Aggressive management means more than aggressive selling; it goes all the way through to modernizing production. The progressive companies are registering the full measure of the increasing activity of their industry. The nonprogressive companies are missing the benefit of the improvement.

Meeting Today's Demands

Much has been said and considerable written on replacement, modernization of mechanical equipment, higher production, lower costs, greater accuracy, relief for inspectors, easier fabrication and assembly. Most arguments are sound and point the way to manufacturing profits where quantity is emphasized. The growing demand for new and modern equipment by discriminating buyers, culminating in a new peak in June, is proof in itself of the wisdom of the policy; and bear in mind, today new designs with entirely new methods and features are available where least expected. Some machines, like railroads, did not increase their speed in a generation until they were forced to meet today's conditions.

You just cannot sit back and feel that the old equipment, or even new

This is the ninth in STEEL's series of articles pointing the path to profits through replacement of obsolete capital goods.

Harry S. Robinson

tools of the old design, will meet today's demand for efficiency. Often the increase in efficiency and accuracy is startling, and makes greater the opportunity for profit. Witness the revolution in the cutting of sheet metal and plate with the introduction of the all-steel shear.

But how about the plant where orders are still the key to profits—orders still to be booked? For the small plant, there is other competition besides price; there is competition in service and in quality. There is competition for good will and prestige.

Getting the Business

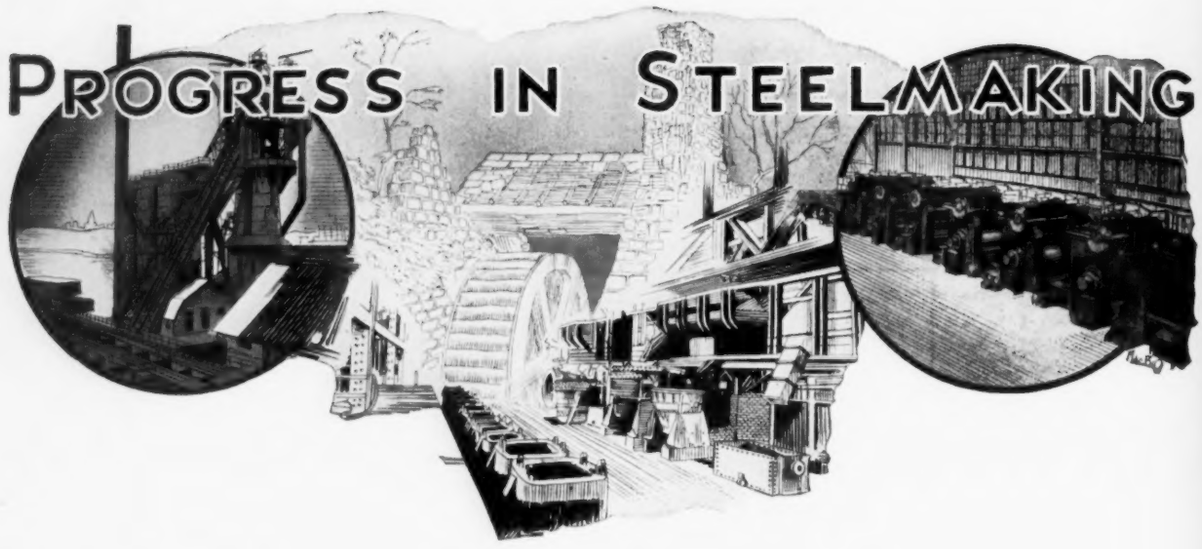
How about the plant in keen competition for customers? Did you ever have your salesmen report that you must re-equip to get orders? It's not unusual. What is a good customer worth? Many a new customer can be secured by the quality of the work you can turn off modern equipment. It is easy to cite contracts placed not because the manufacturer was well-equipped, but because he was better equipped.

Modern equipment frequently will pay for itself in expanding your market and in getting new customers for the growing concern, without taking into consideration the savings effected in the operation of machines.

Equipment Sound Investment

For those who agree on the value of new equipment, there is another thought. The placing of surplus or reserve funds of a company calls for investment. Wise investment seeks security and yield. Generally speaking, price is a measure of security and you purchase not the lower priced bond, but the higher priced even at a sacrifice in yield. Now the purchase of mechanical equipment is just as much a capital investment as the purchase of bonds. Why then hope to find security accompanying low prices here more often than in bonds?

However, there is one happy difference between the investment in securities and the investment in machinery—there is no sacrifice in yield. Carefully selected equipment naturally means security. Efficiency in operation returns a greater yield.



Relationship Is Obtained

Red lead, which for many years has protected various structures around steel plants against corrosion, has come to be considered as the standard preservative. Paint technologists have been endeavoring to deteremine the volume relationship between pigment and oil, at which maximum durability of the coating is obtained. A test now being conducted definitely shows that the pigment should occupy at least 30 per cent or more of the volume of the dried paint film which is equivalent to a mixture of at least 30 pounds or more of dry red lead to 1 gallon of linseed oil.

• • •

Affords Uniform Heating

Heating of a recently designed 2-chamber fuel-fired car type annealing oven is accomplished by a special method. The charge is supported above the actual car top level thus permitting the furnace to be arranged so that all combustion takes place below the charge. This arrangement is said to eliminate the cold car top, to shorten the time required to bring the charge to temperature and to provide closer temperature uniformity throughout the charge. Continuity of operation is afforded by a transfer car and three furnace cars.

• • •

Prevents Formation of Rust

A new rust preventative which is applied to any oxidized, new, damp or dry surface by brushing, spraying or dipping affords a durable protection. The special chemical process permits the liquid to penetrate the pores of the metal, expel moisture, and seal under and around rusted particles to form a hard, continuous surface. Additional formation of rust thus is prevented.

• • •

Facilitates Handling Scale

Roll scale in briquet form is employed at some basic open-hearth shops for oreing down heats. Dextrin is used to bond the scale with a small portion of lime.

Five Money-Saving Ideas

BOILERS, smokestacks and breeching at blast furnaces and steelworks are protected against oxidation by the application of paint mixed in the proportion of five parts of hard asphalt to one part each of raw oil and turpentine. The coating, which will dry hard and glossy, also is satisfactory for protecting the exterior surfaces of steelworks mixers, hot blast stoves and mains and spare machinery parts exposed to the weather.

• • •

Using drills with an angle of about 80 degrees instead of the customary 59 degrees greatly facilitates the drilling of steel sheets. A light feed should be used. A hard wood block should be employed beneath the metal to provide a support for the drill point while its outer periphery is cutting.

• • •

Rubber cement has been found highly satisfactory at a steel plant drafting department for holding tracing paper on a drawing, instead of the usual thumb tacks. A small amount of the cement is applied at each corner. By this arrangement the tracing paper is held securely and the drawing is not marred. The cement is removed easily by rubbing with art gum.

• • •

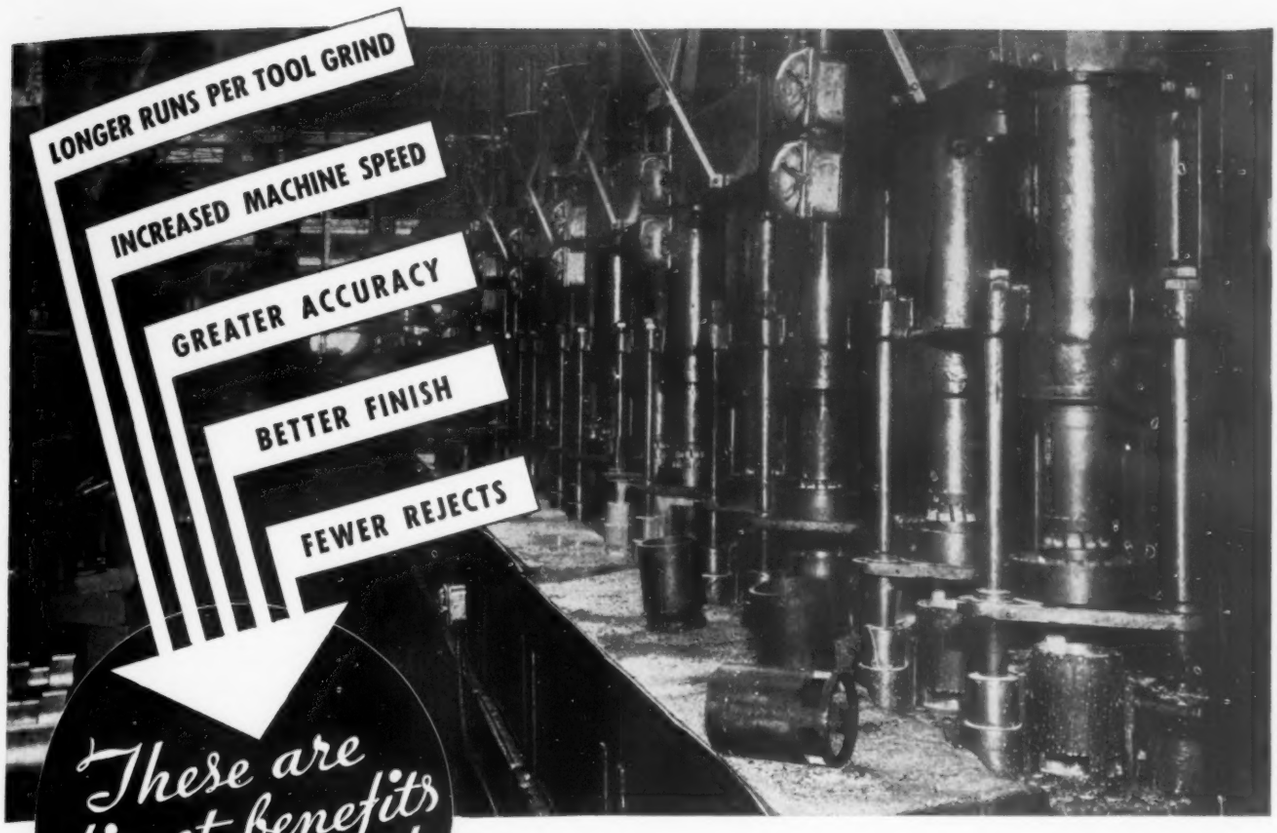
Band saw blades, which break in service at carpenter and pattern shops of iron and steel plants, can be rejoined cheaply and satisfactorily by brazing with the thin brass on electric light bulbs instead of employing the more expensive silver solder. The brass from one bulb is ample for several brazings, its melting point being about the same as silver solder.

• • •

High-speed steel tools for turning large chilled steel mill rolls are greatly improved by tempering in spring water to which sufficient salt has been added to float a potato. Greater hardness also can be imparted to the cutting edge of the tool by adding hydrochloric acid to the quenching bath in the proportion of about ½-pint to 10 gallons of water.

If you desire further information on any idea, announcement, lead or suggestion presented, please write us. Perhaps you know of an idea or "shop wrinkle" that has effected a reduction in operating costs at your plant. If so, won't you send it along?

The Editors



Sunoco Helps Obtain the Rated Capacities of Machine Tools

Why has Sunoco Emulsifying Cutting Oil won consistent use in leading machine shops?

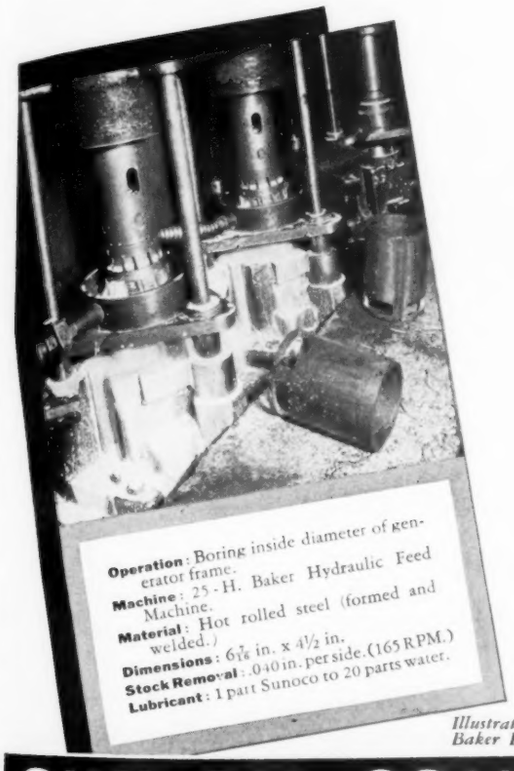
Check up its performance records! They tell the story!

You'll find that Sunoco helps avoid the costly handicaps of frequent tool regrindings, rejected work through faulty finish, inaccurate tolerances and slowed-up production. It's a superior lubricant, a superior coolant.

Experienced machinists know Sunoco. They have seen at close hand how it aids machine tools in producing better work with greater ease and efficiency.

That holds true of the grinding operations, too. Sunoco is a factor in eliminating burning and glazing; it makes possible faster stock removal without increasing wheel wear.

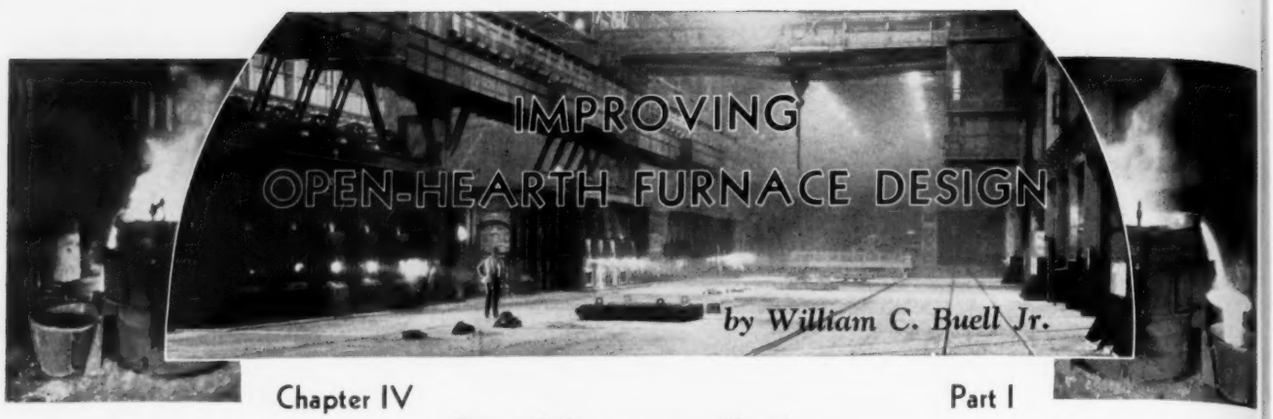
May we send further information or may our cutting oil engineers cooperate?


Operation: Boring inside diameter of generator frame.
Machine: 25-H. Baker Hydraulic Feed Machine.
Material: Hot rolled steel (formed and welded.)
Dimensions: 6 7/16 in. x 4½ in.
Stock Removal: .040 in. per side. (165 R.P.M.)
Lubricant: 1 part Sunoco to 20 parts water.

Illustrations through Courtesy of Baker Bros., Inc., Toledo, Ohio

SUNOCO
EMULSIFYING
CUTTING OIL

SUN OIL COMPANY Philadelphia



IMPROVING OPEN-HEARTH FURNACE DESIGN

by William C. Buell Jr.

Chapter IV — Part I

Typical Regenerator Chambers

THE designation, regenerators of an open-hearth furnace, is an inclusive term of the heat exchange system in which the highly heated voiding furnace gases are caused to give up a large part of their sensible heat to the contained checkerwork. The stored-up heat, following a reversal of the furnace, becomes available to and preheats the counter flowing air in its passage through the regenerator to the furnace throat. Here it is mixed with the fuel and supplies the oxygen component of the combustion reaction as well as the added sensible heat or temperature plane which is essential to the creation of the elevated temperature of the process.

While an increase of flame temperature is the prime object sought by regeneration the salvage of waste heat and its return to the furnace for re-use develops a large incidental fuel savings. Although varying in actual amount with the immediate conditions the general statement easily can be substantiated that each B.t.u. returned to the furnace in preheated air will displace 2 B.t.u. of primary fuel.

Contributes Valuable System

The regenerative system, while specifically designed and patented by Karl Wilhelm Siemens for use in glass manufacture, was probably this inventor's greatest contribution to industry. Although first used over 75 years ago, and at the present time used in essentially its original form, no other arrangement or device has been found suitable to replace it in the practice under discussion.

The regenerators consist of three principal components: First, the regenerator chamber which surrounds and contains the other parts. Second, the checkerwork or "checkers" which are the principal media for the abstraction, storage and delivery of heat. Third, the "rider" system consisting of rider walls, rider arches and rider tile; these support the checkers and form the ducts in which the effluent cooled furnace gases are voided to the flue system for disposal, or the cool air directed to and distributed beneath the checkers.

The design and construction of the chambers and the rider system are the subject of the present chapter, the checkers being considered separately in a following chapter.

Regenerator chambers are located at the extreme outer sides of the furnace system. With the exception of the regenerators of furnace M, which

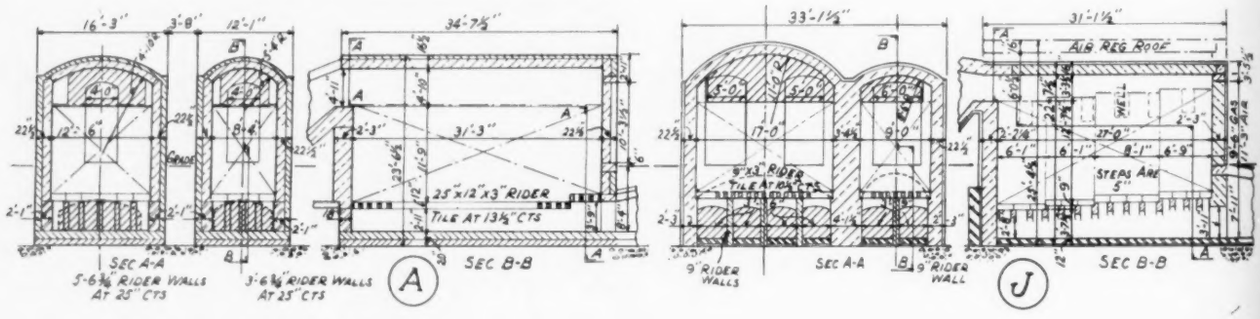
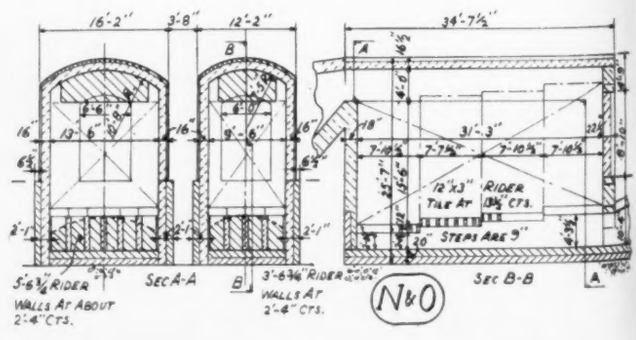


Fig. 134 — Regenerator chambers of Group A (producer gas fired) furnaces



ON GUARD

CONSTANTLY and unceasingly the American Steel & Wire Company is a protection to the industries which it supplies with manufacturing wires. It stands as a proved barrier against undue rejections, high unit costs in fabrication, lack of uniformity, difficulty in handling of faulty materials and against uncertainty of deliveries. If in the manufacture of your product you must have a uniformly high quality wire unvarying in size and temper, and exceptional delivery facilities, you can depend upon American Quality Wire in any form or quantity you need. At all times feel free to use our technical and engineering service which is a part of our "on guard" policy, maintained to help you determine the exact size, grade, shape or analysis that will best serve your production needs and help you to new savings or perfections in your product.

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Table CVII

Dimensions and Volumes Available for Checkerwork in Regenerator Chambers

(Typical Furnaces)

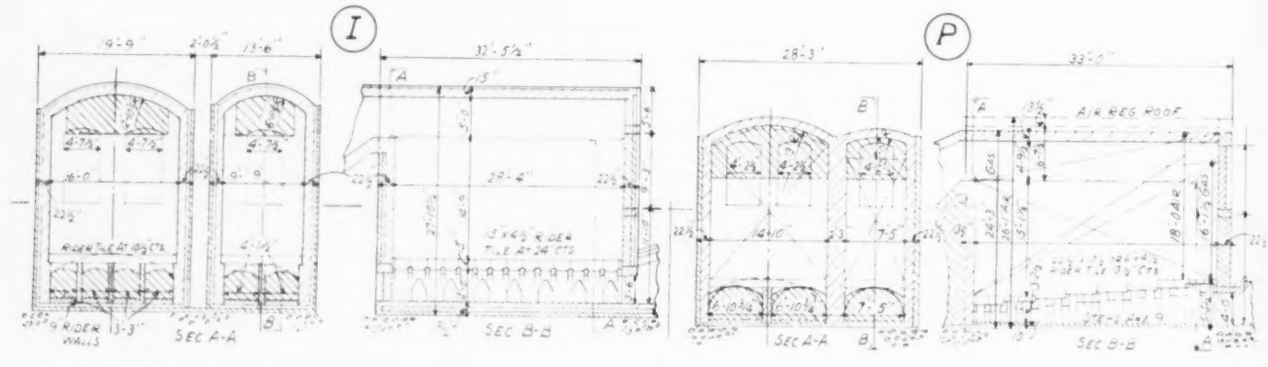
Furnace	Length, ft.—in. a	Height, ft.—in. b	—Air Checkers— Width, ft.—in. c	Volume, cu. ft. d	—Gas Checkers— Width, ft.—in. e	Volume, cu. ft. f	Combined volume, cu. ft. g	Size ratio Air : Gas h
GROUP A								
A	31—3	21—9	12—6	4,980	8—4	3320	8,300	1.50 : 1.0
J	27—0	13—4½	17—0	6,140	9—0	3250	9,390	1.88 : 1.0
N-O	31—3	16—6	13—6	6,960	9—6	4900	11,560	1.42 : 1.0
GROUP B								
I	28—4	16—0	16—0	7,260	9—9	4425	11,685	1.64 : 1.0
P	50—0	15—10½	14—10	7,070	7—5	3535	10,605	2.00 : 1.0
GROUP C								
G	23—0	13—9	16—1	5,080	11—6	3635	8,715	1.34 : 1.0
L	30—0½	18—5	15—1½	8,350	9—9	5385	13,735	1.55 : 1.0
GROUP D		11—10½ (A)						
B	23—11½	10—1½ (G)	11—4	3,240	8—3	2395	*5,635	1.37 : 1.0
D	25—0	12—0	13—10	4,145	8—5	2525	6,660	1.64 : 1.0
E	30—1	11—4½	10—11	4,450	7—5	3045	7,495	1.46 : 1.0
H	25—0	12—6	13—7½	4,260	9—1	2980	7,240	1.43 : 1.0
F	29—11	11—10½	15—11	5,650	10—11	3730	9,380	1.45 : 1.0
M	38—7¾	12—1	21—6	10,025	.....	.....	10,025	.....

*Furnace B has auxiliary checkers which add about 600 cubic feet to the figure given.

are a three-compartment arrangement operating as a single chamber because of the connecting openings in the interior wall, the regenerators at each side consist of two chambers. The inner and wider chamber always is used to preheat the air; the outer and narrower chamber is used to superheat producer gas, if this fuel is employed, or, to heat mixed coke oven-blast furnace gas sufficiently to accomplish the cracking of the methane and higher homologous gases if this fuel is used and fired in accordance with Bansen's practice. In any other fuel practice both chambers are used to preheat air only.

The regenerator chambers then consist of four rectangular units of considerable size, constructed of refractory material and bound with steel. All units are of similar length, which varies considerably in different plants owing to differences of building layout.

The height of the air and gas chambers is similar, varying only in certain cases, in the order of the difference of the spring of the complementary air and gas roofs. The



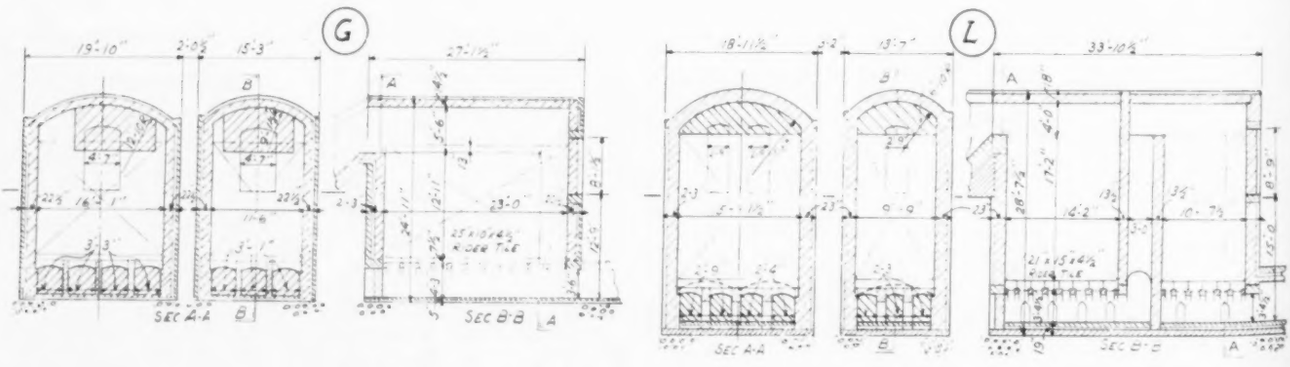


Fig. 135 (Above)—Regenerator chambers of Group B furnaces. Fig. 136 (Below)—Regenerator chambers of Group C (mixed gas fired) furnaces

extreme height of the regenerators is limited to a distance within the dimensions of the underside of the charging floor supporting steel and the subgrade to which construction can be carried conveniently.

The width of the regenerator differs considerably in the several plants and is circumscribed by the necessities of building layout.

The regenerator chambers of the typical furnaces are illustrated in Figs. 134 to 137, and a casual examination show them to vary considerably in all dimensions.

The prime purpose of the regenerator chambers is to act as the enclosures of the checkers. Therefore, the volume of the checker work that may be contained in a regenerator chamber is the measure of the effective size of that chamber.

Accordingly, the dimensions and volumes available for checker work in the regenerator chambers of the typical furnaces have been abstracted and listed in Table CVII as well as the size ratio of the larger (air) and the smaller (gas) chamber. This last value shows that the ratio of air to gas chamber volume, furnaces J and P, is in the approximate order of 2:1, while all others appproximate 1.5:1.0. This latter ratio is a relic of old time producer gas practice and is of no particular significance today.

The dimensions of length and width, Table CVII, are those inside of the brickwork. That of height is the distanoe between the sill of the regenerator entrance and the top of the rider walls or arches, and thus the volume is computed as with the elementary box-type checkerwork installed. Since the figures are developed for one set of regenerators only it will be obvious that the total checker volume of a furnace will be double the figures of columns d, f and g.

Unless the volume figures are reduced to a common base they have little comparative value. An archaic and arbitrary design value supposed to represent an ideal was 100 cubic feet of checkers per ton of rated furnace capacity. This patently was a worthless value as it did not take into consideration the important factors of actual operating capacity, operating rate or fuel practice. It would appear that "cubic feet of checkerwork per ton produced per hour" might be a much better standard of comparison than the first value, but so as to demonstrate the fallacy of using either figure as a design factor a comparison on the second basis is offered in Table CVIII. The unit variation, within the range 12 to 20,

Table CVIII

Comparison of Checker Volume to Output

Furnace	½-Checker volume of furnace, cu. ft. a	Tons of ingots per hour b	Ft.³ checker per ton ingots per hour c
A	8,300	13.16	1252
J	9,390	13.41	1400
K	.....	13.86	.....
N	11,560	16.97	1361
O	11,560	19.15	1208
I	11,685	17.22	1356
P	10,605	13.57	1564
G	8,715	12.17	1432
L	13,735	13.74	2000
B	6,135	10.02	1226
D	6,660	9.24	1441
E	7,495	11.58	1294
H	7,240	10.51	1379
F	9,380	11.04	1700
M	10,025	13.44	1493

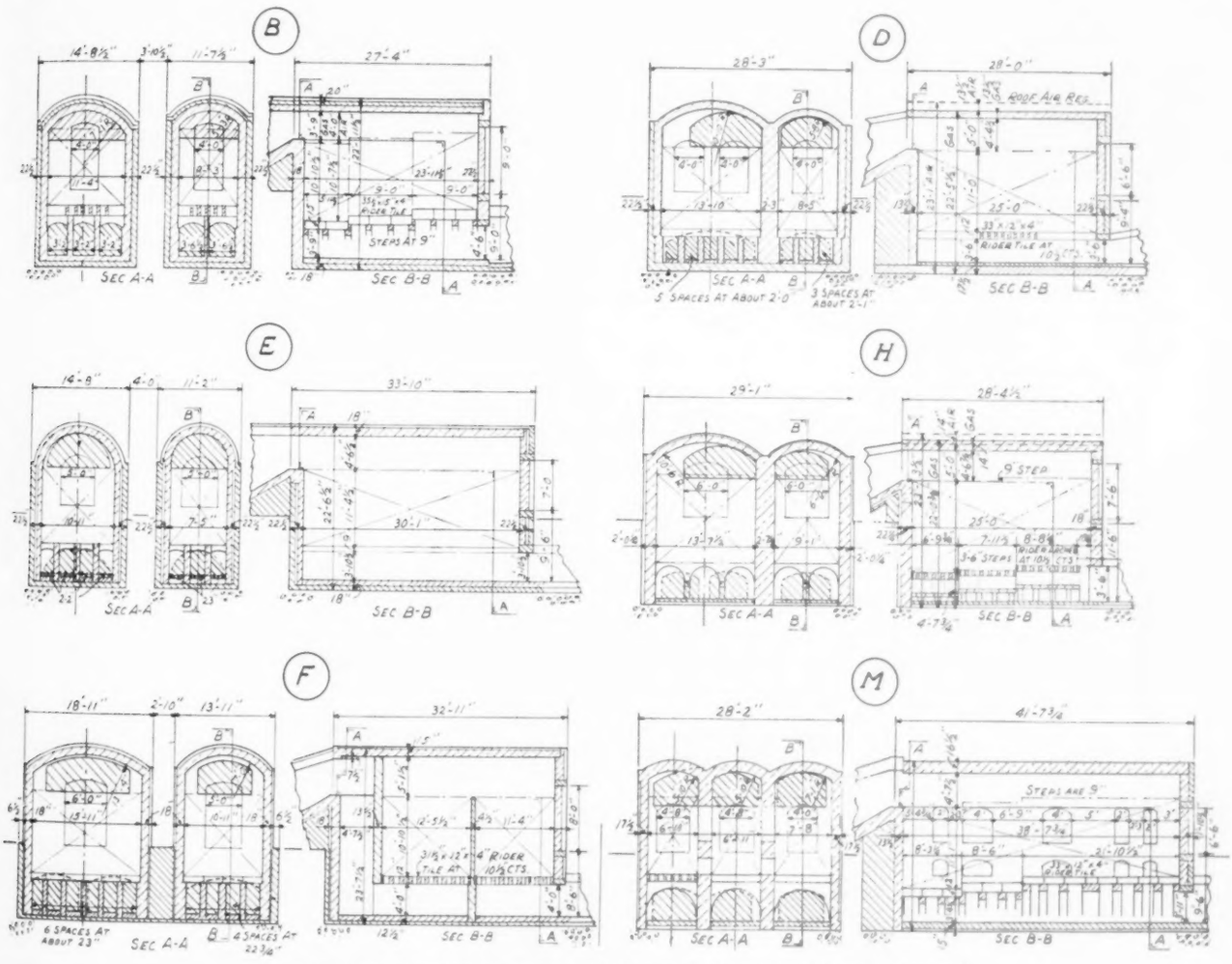
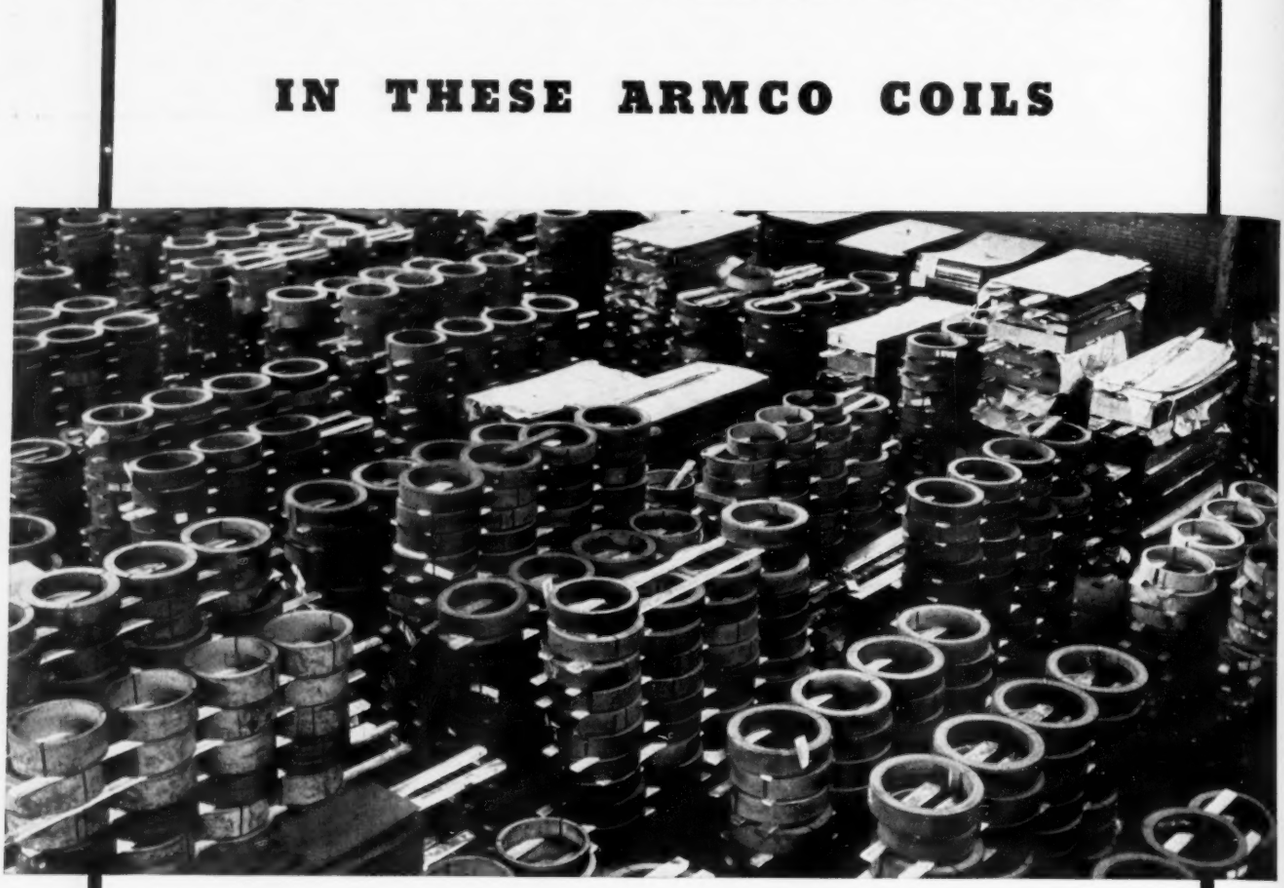


Fig. 137—Regenerator chambers of Group D (fixed fuel fired) furnaces

THERE ARE DOLLAR-SAVINGS IN THESE ARMCO COILS



Here is a veritable ocean of top-quality coils—all destined to cut stamping costs for Armco's customers.

You, too, can share in these desirable cost-savings, either by sending in your specifications for automatic press stampings, or by calling in an Armco Man experienced in solving unusual problems.

For one thing, you'll reduce scrap losses through continuous operations. One operator can easily handle several presses. And you don't need a big warehouse either; for Armco Hot and Cold-Rolled Coils are compact and conserve your valuable storage space.

Armco Coils, like Armco Sheets, are processed to order with the necessary temper, finish and drawing properties. Yet the big feature to remember is that the yield is high, even when the draw is severe on automatic fast-action presses.

You can order Armco Hot and Cold-Rolled Coils in any width from 1½" to 38", in a wide range of gages. Shall we talk over your coil requirements? Just communicate with The American Rolling Mill Company, Executive Offices, 703 Curtis St., Middletown, Ohio.

ARMCO

HOT-ROLLED COILS

COLD-ROLLED COILS

is too great to be of value. No further comments are necessary on this subject.

Given the volumes of air and fuel passing the regenerators per unit time and inasmuch as a principal function of the regenerative system is to preheat the incoming fluid it seems as though the volume of checkerwork available to preheat a unit volume of these fluids in a unit time might offer a worthwhile comparison upon which to premise design. Such a value takes into account all of the operating factors, including production speed and fuel practice. The appropriate figures are offered in Table CIX.

The values of checker volume a and d, are carried forward from Table CVII, and those of fluid volume, columns b and e, from Table XCII, columns g and h. The factors, columns c, f and e, represent the volume of checkerwork per cubic foot of fluid per second, after giving effect to a modifying condition in connection with the gas system.

Air and Fuel Heated

As a general statement the air is presumed to be preheated from atmospheric temperature to about 2000 degrees Fahr., as is also the mixed gas fuel, furnace L; and the producer gas superheated from perhaps 1100 to 2100 degrees Fahr., or through but approximately one-half of the temperature range of the air or the mixed gas. Therefore, in calculating the gas factor, Table CIX, column f, in the case of the group A furnaces only, the value is considered as but one-half that found by dividing the figures in column d by those in column e.

Accordingly, including this correction, the values in column g are a truly comparative unit figure of the combined regenerator units of the several typical furnaces. The figures being for one set of regenerators, represent only one-half those of the entire furnace, or on account of the reversing feature, may be considered as representative of the maximum effect secured at any given time.

(To be continued)

Develops New Machines

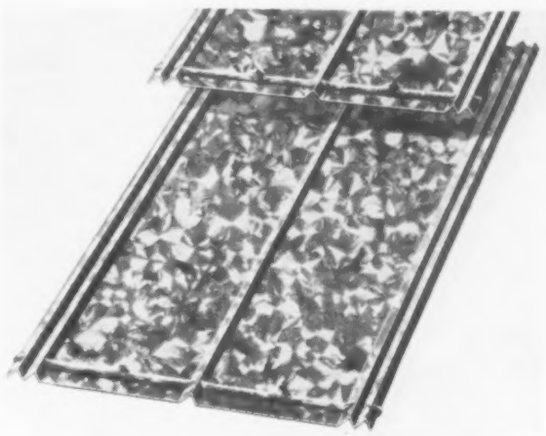
Several new products have been developed by the Fidelity Machine Co., 3908 Frankford avenue, Philadelphia. One of them is a belt loop cutting unit which fits on sewing machines and is used largely in the garment manufacturing industry.

Another is a machine for feeding paper sheets and cards automatically into power die stamping presses in the engraving industry. With the new automatic feeder the letterheads or cards are stacked at the magazine end of the machine and the letterhead, with perfect registration, is engraved and automatically passed through a drying unit and stacked for packing.

The company also has developed a new machine for introducing Lastex yarn as well as raw rubber into the tops of hosiery.

Ends Capillary Leakage In Roofing Sheets

An improved galvanized steel roofing sheet known as Globe Dri-Lap and developed and produced by the Newport Rolling Mill Co., Newport, Ky., is provided with a bead rolled across the bottom, preventing water from rising through the overlapping joints and leaking through the roof. The bead serves as an air lock which breaks up capillary attraction producing such leakage. It also adds stiffness to the sheet.



THE principal feature of this new galvanized steel roofing sheet is the bead rolled across the bottom to form an air lock which prevents water from rising between the sheets from capillary attraction

In the bead, and in the center of each panel, is rolled a nail seat, making it possible to nail the end of the sheet in two places. This extra nailing is said to result in a roof with greater weather and wind-resisting properties, while the seat is so formed as to function with the bead in preventing the rise of water.

Courses Align Automatically

The new roofing sheet, shown in the accompanying illustration, retains the five V crimps which the company previously employed. These, with the new bead, automatically align the courses as they are laid.

The new sheet is being introduced with considerable success by demonstrating it in agricultural districts. The demonstrating outfit consists of transparent glass plates which make visible the capillary action by which water rises between the plates, and which also show the effect of the crimps in breaking up this flow.

Table CIX

Comparative Checker Volume Per Unit of Air or Gas Flow

	Air Chamber			Gas Chamber			
Furnace	Volume checker work cu. ft. a	Air ft.³/sec. b	Factor a/b c	Volume checker work, cu. ft. d	Gas ft.³/sec. e	Factor * f	Combined factor c and f g
Group A							
A	4,980	232.0	21.5	3320	211.0	7.9	29.4
J	6,140	201.3	30.4	3250	183.0	8.9	39.2
K	.....	212.0	.....	.....	192.8	.....	.....
N	6,960	280.0	24.8	4900	255.0	9.6	34.4
O	6,960	310.0	22.4	4900	278.0	8.8	31.2
Group B							
I	11,685	268.5	43.5	.....	.....	.....	43.5
P	10,605	228.0	46.5	.....	.....	.....	46.5
Group C							
G	8,715	200.8	43.4	.....	.....	.....	43.4
L	8,350	235.0	35.5	5385	107.5	50.0	85.5
Group D							
B	6,135	173.0	35.4	.....	.....	.....	35.4
D	6,660	161.5	41.2	.....	.....	.....	41.2
E	7,495	205.8	36.4	.....	.....	.....	36.4
H	7,340	188.7	38.3	.....	.....	.....	38.3
F	9,380	187.3	50.0	.....	.....	.....	50.0
M	10,025	222.1	45.1	.....	.....	.....	45.1

*See text for explanation of method of calculation of figures of column f.

NEW EQUIPMENT

Drill—

Rotor Air Tool Co., Cleveland, recently brought out a new model drill made in both reversible and non-reversible types and in two speeds. The 450 R.P.M. model is rated 29/32-inch drilling and 11/16-inch reaming capacity. The 360 R.P.M. model is rated for 1 inch drilling and 13/16-inch reaming capacity.

The motor is of the twin-rotor external blade rotary type. This is a simple construction which eliminates numerous parts such as pistons, connecting rods and toggles and also substantially reduces the weight. The manufacturer claims it has a smooth running action free from vibration. As the unit, shown herewith, weighs only 20 pounds, much work that formerly required two men can now be done by one man. A new type four-port quick-acting governor is used to control the free speed, thus preventing excess wear to the motor and excess drill and reamer breakage.

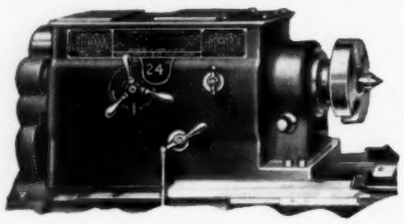
Type E-50-C drill built by Rotor Air Tool Co.

• • •

Lathe—

Lehmann Machine Co., Chouteau and Grand boulevard, St. Louis, recently brought out a new lathe known as the Hydratrol, shown herewith. The pulley drive shaft carries three hydraulically-operated friction clutches. One of these clutches provides eight reverse speeds and the other two the initial speed progression for the sixteen forward speeds selectively functioning through the selector valve and operatively through the control valve.

A conventional gear arrangement has three hydraulically-operated external and internal gear type double positive clutches to complete the sixteen spindle speed changes which are in almost exact geometrical progression. Speed changes are effected by turning a three-lever handle on the front of the headstock. This may be turned without intermediate stop to any speed desired and it is unnecessary to disengage the friction driving clutch when a speed change is made. Co-ordinating with the movement of the handle is an automatic slide rule which shows spindle revolution per minute and indicates a slide rule calculation of the cutting speeds in feet per minute. Diameters of work within the ranges of the lathe are given on the sliding member and register with the effective cutting speed on the stationary scale.



Lehmann Hydratrol lathe equipped with automatic slide rule

The control lever is shown below and to the right of the speed change handle. It has three positions, forward, stop and reverse. The handle permits operation at the head and it is connected to a control handle on the apron.

Spindle release for chucking is obtained by turning a small T handle at the front end of the headstock. Movement of this handle disengages the positive clutch and brake on the spindle so that it can be turned easily by hand.

These items of industrial equipment were announced by manufacturers last week and will be described in early issues of STEEL:

Specially tooled semiautomatic engine lathe, Monarch Machine Tool Co., Sidney, O.

Flexpin couplings, Smith & Serrell, Newark, N. J.

Condensation return unit, Decatur Pump Co., Decatur, Ill.

Larger sizes of Greaseal bearings, Norma-Hoffmann Bearings Corp., Stamford, Conn.

Burnishing barrel, Hanson-Van Winkle-Munning Co., Matawan, N. J.

Automatic adjustable orifice, Bailey Meter Co., Cleveland.

Vertical spindle surface or face grinder, Hanchett Mfg. Co., Big Rapids, Mich.

Washing and drying units, Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.

Centrifugal dryer, Hanson-Van Winkle-Munning Co., Matawan, N. Y.

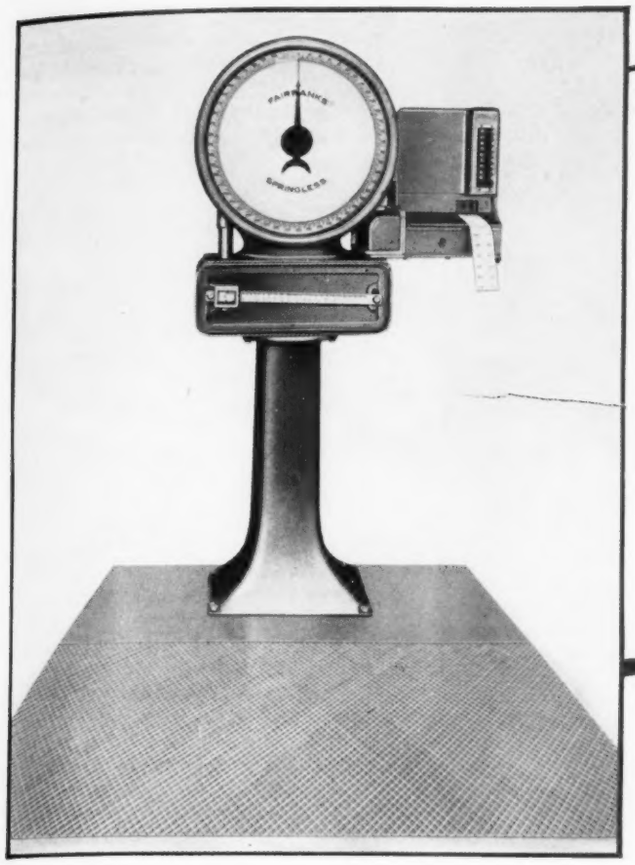
• • •

Industrial Analyzer—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a new industrial analyzer for testing electrical apparatus and motors which incorporates many refinements. Improvements include additional testing capacity instruments with knife edge pointers and fine line scale divisions; increased voltage range to 575 volts; a manually-operated pusher pointer for the ammeter to obtain motor starting currents; new arrangement of panel and switching, providing disconnect features for potential circuits for use with transformers which have grounded secondaries or for use on 2-phase, four-wire circuits; and a new case with nickel plated hardware.

Westinghouse industrial analyzer which has increased capacity for testing electrical apparatus and motors

The analyzer, shown in the accompanying illustration, is adaptable for testing 3-phase induction motors; trouble shooting, checking and testing all kinds of alternating-current circuits; plant layout, analysis and efficiency tests; etc. It does the work ordinarily performed by an ammeter, voltmeter, polyphase wattmeter, polyphase power factor meter, four current transformers and a voltage transformer. It is light weight and compact, weighing 35½ pounds and measuring 9¼ x 13¼ x 18⅝ inches. Overall accuracy of the in-



THIS SLEEPLESS *Weighmaster* WORKS 24 HOURS A DAY..AND MAKES NO MISTAKES

Fairbanks Printomatic Weigher with pedestal-type dial—platform flush with floor.

● The five o'clock whistle means nothing to him . . . he never watches the clock for the lunch hour . . . and overtime never finds him too tired to weigh anything. His weigh tickets are never scrawled, and they're *always* accurate.

For when the Fairbanks Printomatic Weigher goes into service in your plant, errors STOP.

By guarding the flow of materials . . . by accurate accounting and checking in processing . . . by recording shipping and receiving room weights —by a score of other services they keep costs down and provide the control that means a larger operating profit.

In hundreds of industrial plants, Fairbanks Printomatic Weighers are saving their way—paying for themselves in the savings they effect. They can do the same for you. Why not write for full information today? Address Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill. And 40 principal cities—a service station at each house.

Fairbanks Scales

PREFERRED THE WORLD OVER

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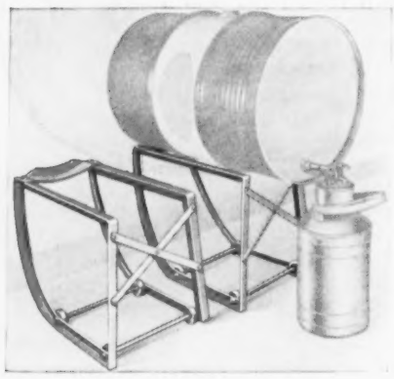
struments is within 1 per cent for the ammeter and voltmeter and 2 per cent for the wattmeter. By use of extra current and voltage transformers, the analyzer may be used on circuits with voltages higher than 575 or currents greater than 125 amperes.

• • •

Cradle Truck—

Morse Mfg. Co. Inc., Syracuse, N. Y., announces a new barrel and drum cradle truck designed for ease in handling heavy drums. It is sufficiently high for use with the highest 5-gallon cans, can be shipped knocked down and is provided with rollers of liberal size.

The ease with which large drums



Heavy drums and barrels may be handled and unloaded with ease by means of this Morse cradle truck

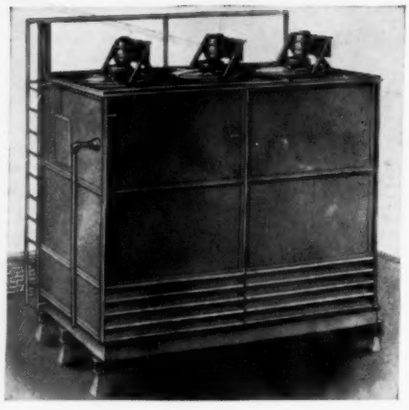
may be unloaded into smaller receptacles with the aid of one of these trucks is shown in the accompanying illustration. The truck is constructed of steel angles with corners double and riveted and with malleable iron nose pieces. The rollers are provided with a shaft that will not bend.

• • •

Cooling Towers —

Binks Mfg. Co., 3114 Carroll avenue, Chicago, recently announced a new line of induced draft cooling towers with a cooling capacity ranging from 5 to 200 gallons per minute. These new type towers are recommended for industrial plants using diesel engines and other internal combustion engines which need jacket water cooling for their effective operation. These compact new type towers, shown herewith, will find many other industrial applications where water cooling is a necessity to economical and efficient operation.

Water distribution in the new type induced draft towers is secured through standard Binks patented low pressure clogproof "Rotojet" nozzles. The nozzles spray a finely



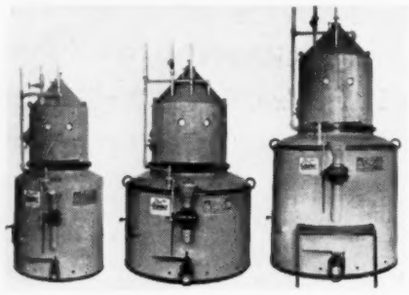
Binks induced draft cooling tower

atomized mist of water downward through upward currents of air induced by the fan assemblies placed at the top of the tower, thus assuring maximum water and air contact. During cool weather, where towers are required for year around operation, the fans may be shut off and ample cooling capacity secured without their use.

• • •

Medium Pressure Generators—

Linde Air Products Co., 30 East Forty-second street, New York, announces a new three-member family of acetylene generators of the medium pressure type for stationary service. These generators, designated as Oxweld type MP-5, have a carbide capacity of 150, 300 and



Oxweld type MP-50 *medium pressure acetylene generators*

500 pounds, respectively, with acetylene generating capacities ranging from 300 to 1000 cubic feet per hour. The three units, shown herewith, provide users of the oxyacetylene process with a range of choice that should fit practically every need for a stationary generating source of medium pressure acetylene. Except for slight differences in design, making each generator better adapted to the operating conditions for which its size makes it suited, all three generators resemble each other in essential details.

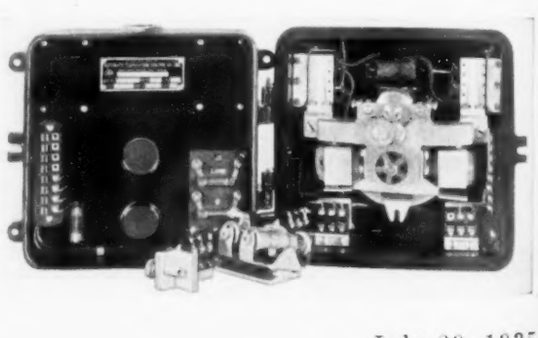
Each generator has all controls protected by a housing which can be padlocked, if desired. This will prevent unauthorized persons from operating the generator or tampering with it. The gravity type feed control unit is self-contained and is bolted to the inside of the upper section of the generator. Withdrawal of acetylene gas in operation operates a diaphragm type feed control which causes a feed valve to open. The diaphragm is sensitive to slight changes in pressure and the carbide is released evenly in just the amount needed to maintain a constant pressure.

Rapid emptying and recharging are made possible by three features. One is a large lubricated plug valve for draining the carbide residue. Another is a water filling valve of similar construction. The third feature is an unusually large carbide charging door.

• • •

Time Controls—

Automatic Temperature Control Co. Inc., 34 East Logan street, Philadelphia, introduces its new Series 1274-5-6 time controls, designed to repeat one or two operations or processes as often as desired. Provision has been made for exceedingly flexible choice of periods during which the controlled actions take place. Time controls in this series will handle a repetitive action or operation requiring a definite time period or cycle with either the same or different time period between successive time cycles. The time cycle and also the interval between successive cycles is infinitely adjustable with an accuracy of setting to within a split scale division of the respective dial ranges selected. As shown in the accompanying illustration, parts have been so grouped on the chassis that adjustment is simple. Jack



This time control unit, a product of the Automatic Temperature Control Co., is exactly adjustable to job requirements

connections permit removal of parts without disturbing wiring. Settings remain accurate despite vibration. Special contact metal transmits current even when oxidized. The control is built for operation on alternating current of 110 volts, although 220-volt equipment can be supplied upon order.

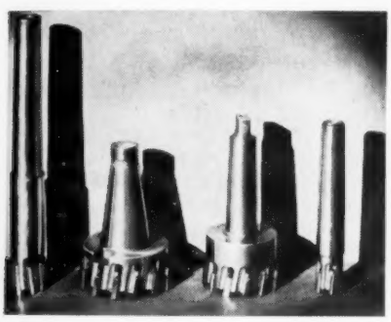
♦ ♦ ♦

Zee Lock End Mills—

Ingersoll Milling Machine Co., Rockford, Ill., announces that its zee lock cutter which was designed particularly for its face mills, has now been applied to inserted blade end mills. The zee lock cutter blade is positively locked in the cutter body by a zee-shaped wedge. The wedge is shaped so that in addition to locking the blade, it permits the blade to be adjusted automatically in two directions. That is, mostly outwardly on the diameter but also a slight amount along the face.

Applied to small end mills, as shown in the accompanying illustration, it makes a simple and effective tool. Using renewable cutter blades of either high speed steel, super-cobalt high speed steel, "J" metal, or cemented carbide, the cutting edge and only the cutting edge is of hard and heat resisting material. Cutter blades are of forged and heat treated chrome molybdenum steel.

End milling cutters as small as 1½-inch diameter are made. Cut-



Ingersoll end mills incorporate zee lock cutter blades locked in the cutter body by a zee-shaped wedge

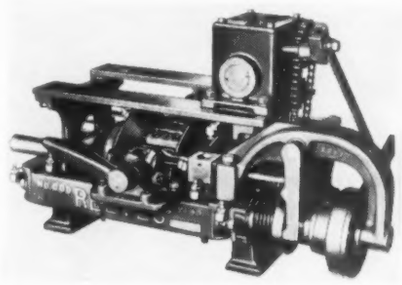
ters are furnished with blades of suitable thickness or spacing for either roughing or finishing operations. They can be provided with shanks to fit the national standard milling machines, Ingersoll or Seller tapers, etc. Cutter housings with an extended body are obtainable for special operations.

♦ ♦ ♦

Automatic Variable Speed Ratchet Control—

Reeves Pulley Co., Columbus, Ind., recently developed a ratchet control for automatic variable speed regulation through the Reeves variable speed transmission. While this control, as illustrated, was built for a special purpose, the principle is applicable to any requirements calling for gradual increase or decrease of machine speeds over a specific period of time.

The power input (constant speed) shaft of the variable speed transmission is driven from any source of power—motor, lineshaft, engine, etc. —and drives to a gear reducer of proper ratio, according to the individual requirements, through roller chain. Output shaft of the reducer is connected by an adjustable arm to the ratchet which is mounted on an extension of the speed changing screw of the transmission. The adjustable arm permits increase or decrease in timing of the control as required. Thus, when the speed range required over the fixed period or time is known, the ratchet may be set so that the transmission begins



Automatic variable speed ratchet control introduced by Reeves Pulley Co.

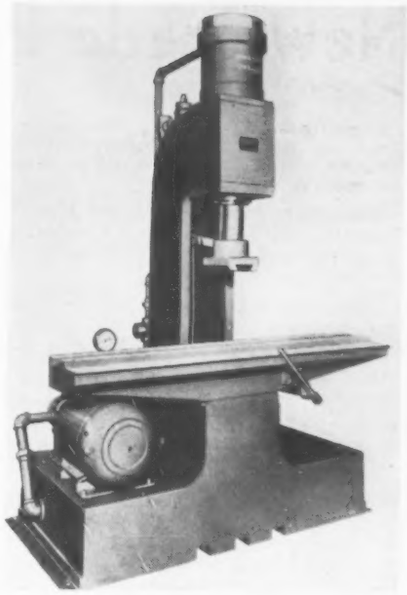
operation at either extreme—maximum or minimum—of speed and at the end of the period has attached the other extreme limit.

In the case of the unit shown, this variation produces only 3⅛ turns of the speed changing screw in 11 hours and provides from 196 to 279 revolutions per minute on the variable speed (power output) shaft of the transmission. When the extreme limit and end of run is reached, the transmission is shifted by hand back to the starting speed position and the ratchet is reset by the lever shown. Stop nuts on the screw at right of this lever prevent the unit from overrunning the extreme speeds.

♦ ♦ ♦

Straightening Press—

Hannifin Mfg. Co., 621-31 South Kolmar avenue, Chicago, recently developed a new type 35 ton hydraulic press designed for straightening operations on axle shafts, crankshafts and similar work requiring accurate straightening. A single lever controls the entire operation of the ram with an extremely sensitive proportional control action. When the control lever is moved in either direction the ram will move a proportional distance and then stop by



Hannifin straightening press is extremely sensitive

automatically bringing the operating valve to neutral. Thus the operator, merely by moving the one operating lever, obtains a ram movement at 35 tons pressure through the exact distance required for the straightening of any piece. An accurate ram movement, either up or down, of as little as 1/16 inch may be obtained. The arc of movement of the control lever is approximately 3 times the ram stroke, providing for sensitive handling without requiring the development of special skill on the part of the operator.

The hydraulic power unit with constant delivery type rotary pump is built into the base of the press making a self-contained unit that requires approximately 19 square feet of floor space. No separate hydraulic power is required, simplifying the installation and making operation unusually economical. The ram delivers 35 tons pressure and may be fitted with any type of fixture required for handling the parts to be straightened. The ram stroke is 6 inches. Power stroke is 53 inches per minute and return stroke 77 inches per minute.

♦ ♦ ♦

Improved Swivel Joints—

Barco Mfg. Co., Chicago, recently developed improved swivel joints for use on platen presses and similar machinery to connect piping between moving parts. The new joint incorporates a metal washer or bearing at each end of the spring, thus eliminating the spring wear on the two parts of the joint, viz.: the ball and casing. This improvement not only prolongs the life of the major portions of the joint, but also greatly reduces the possibility of spring breakage.

New Trade Publications

Abrasives—Norton Co., Worcester, Mass. A booklet, illustrated, on its abrasive cut-off wheels for metals and non-metals.

Washfountains — Bradley Washfountain Co., Milwaukee. A catalog citing economy of water, floorspace and installation cost.

Protective Hats—Mine Safety Appliance Co., Pittsburgh. Bulletin describing its line of industrial protective metal hats.

Flexible Coupling—Smith & Serrell, Newark, N. J. Bulletin No. 49, devoted to its improved flexpin coupling, with illustrations and data tables.

Engine Lathe—Monarch Machine Tool Co., Sidney, O. A catalog of its specially-tooled semi-automatic engine lathe, graphically illustrated.

Steel Tubing — Summerill Tubing Co., Bridgeport, Pa., a circular suggesting uses for steel tubing to illustrate its wide adaptability, a supplement to its recent tubing catalog.

Forging Machines—National Machinery Co., Tiffin, O. A leaflet calling attention to its forging machines in bigger, heavier and more powerful types.

Taps, Dies, Screw Plates—Winter Bros. Co., Wrentham, Mass. Catalog No. 17 listing these products in carbon and high-speed steel, with cut and ground thread.

Speed Reducers—Janette Mfg. Co., 556 West Monroe street, Chicago. A price sheet on its motorized speed reducers, designed for ease in finding prices.

Silica Firestone—Cleveland Quarries Co., Cleveland. Bulletin No. 15, describing its silica firestone for use as refractory lining, illustrated and containing data tables.

Drainage Pump — Worthington Pump & Machinery Corp., Harrison, N. J. Bulletin W-316-B3, describing pumps for sewage, drainage and sump service.

Welded Machinery Design—Lincoln Electric Co., Cleveland. Application sheet No. 44, series 2, on working out the all-welded design for machinery, a continuation of sheet No. 43.

Steel Chains, Sprockets—Palmer-Bee Co., Detroit. Section 101 of general catalog No. 100, devoted to steel chains and sprocket wheels for elevating, conveying and power-transmitting machinery.

Grinding Wheels—Abrasive Co., Tacony and Fraley streets, Philadelphia. A folder describing new and simplified wheel markings as applied to tool and cutter grinding wheels.

Insert Chaser Die Heads—Eastern Machine Screw Corp., New Haven, Conn. A bulletin on its insert chaser die heads, known as the "razor blade head," because of the small inserted chasers, thrown away when dulled.

Industrial Thermometers — C. J. Tagliabue Mfg. Co., Park and Nostrand avenues, Brooklyn, N. Y. Catalog No. 1125, showing complete line of industrial and other types of thermometers, hygrometers, U gages, mercurial vacuum gages and mercurial barometers.

Combustion Control—Bailey Meter Co., Cleveland. Bulletin No. 102, describing complete combustion control system to maintain steam pressure, combustion efficiency and furnace draft automatically.

Combustion Furnaces—Hevi Duty Electric Co. Milwaukee. Bulletin HD-735 describing its standard line of organic combustion furnaces, with illustrations and diagrams and tables of specifications.

Cable Compounds—General Electric Co., Schenectady, N. Y. Bulletin GEA-2113, superseding 1789-1790 and 1648A, treats of rubber and rubber-like compounds for insulating and sheath applications.

Nonferrous Alloys—Williams & Co. Inc., 1748 East Twenty-second street, Cleveland. A stock list of items for prompt delivery in brass, copper, bronze, copper alloys, aluminum and alloys and allied products.

Drop Hammer—Chambersburg Engineering Co., Chambersburgh, Pa. Bulletin No. 255, describing its model E steam drop hammer, featuring the new slide valve, heavier anvil and new alloy used in construction.

Eye Safety—Chicago Eye Shield Co., 2300 Warren boulevard, Chicago. Catalog of its industrial head and eye protective devices, including new and improved products, goggles, respirators and masks.

Stainless Strip Steel—Acme Steel Co., 2840 Archer avenue, Chicago. A bulletin on its silcrome HB stainless strip steel, giving physical tests, instructions for fabricating and a guide to corrosion resistance.

Ventilation—Swartwout Co., 18511 Euclid avenue, Cleveland. A folder describing its natural system of ventilation of industrial buildings by stack and aspirating effects, with diagrams.

Coolant Pumps — Acme Machine Products Co. Inc., Muncie, Ind. Catalog No. 140, describing its new line of pumps in motor-driven and belt-driven types, low and high pressure, in capacities from four to 100 gallons per minute.

Pumps—Worthington Pump & Machinery Corp., Harrison, N. J. Bulletin No. W-317-B4, on vertical centrifugal pumps, single stage volute, type F; No. L-800-B1 on air-lift pumping systems operated by air compressors.

Combustion Control—Smoot Engineering Corp., 2240 Diversey parkway, Chicago. Data book No. S-20 discussing basic problems of boiler operation and value in efficient steam generation. Diagrams illustrate application of mechanical control.

Excavating Buckets — Industrial Brownhoist Corp., 4403 St. Clair avenue, Cleveland. Catalog No. 353 on its complete line of rope-reeve, power wheel, lever arm and link-type buckets, with ample illustration and table of data.

Welded Piping — Air Reduction Sales Co., 60 East Forty-second street, New York. A booklet containing facts about welding piping for buildings to show advantages of the company's welding process; profuse photographic illustrations show installations.

Effect of Recent Machine Tool Developments

(*Concluded from Page* 29)

of no consequence. In these days of rapid change, however, stability of that sort is rare, and the chances are that the machine sooner or later will be called upon to produce something far different than that part for which it is tooled up in the first place.

Drastic annual changes in product design are common, but the useful life of a machine tool is from five to ten years even under high pressure production conditions. Under such circumstances it is obvious a versatile machine is by far the safest investment.

Do Not Let Competition Lead Way

14. *Will your chief competitor stick to his old machine tools, or will he re-equip his plant?* Many a manufacturing enterprise has gone to the wall as a result of a wrong guess on this one. The safest assumption in these days of keen competition is that your competitor is planning to re-equip, and the safest procedure is for you to lose no time in re-equipping your own plant.

With the widespread publicity now being given to recent developments by the machine tool industry, you can be sure that somewhere down the line some competitor will take advantage of these remarkable developments, and if neither you nor your chief competitor choose to do so, you both will wake up some morning in the not far distant future to find that neither of you is a leader in your industry any longer. Leadership will have passed to this third party who lost no time in taking advantage of the remarkable production possibilities of new machine tools.

Rustless Steel Car Shown

Rustless Iron Co. of America, Baltimore, is exhibiting a coal car of rustless steel, designed to save railroads the heavy losses from corrosion of steel rolling stock. It will be exhibited at Philadelphia and New York later. The rustless steel is lighter than carbon steel, ordinarily used, and offers an economy in heavier payload.

Scrap Prices, Steel Rate Continue To Rise

Consumers Anticipating Larger Needs; Industrial Building Construction Up

MARKET IN TABLOID

DEMAND *. . . Broadening. Users anticipating requirements.*

PRICES *. . . Scrap up 50 cents to $1 a ton. Iron, steel firm.*

PRODUCTION *. . . Ingots 2 points higher at 45 per cent; tin plate up 10 to 90 per cent; full-finished sheets down 5 to 40.*

SHIPMENTS *. . . Rising.*

A GENERAL expansion in steel demand now appears to be under way, few consuming industries failing to show some measure of improvement.

Users are anticipating requirements, for larger tonnages, and further ahead. Steelmakers themselves are increasing stocks of raw steel.

Due principally to these factors, steel ingot production last week rose 2 points to 45 per cent, highest since the last week in April, notwithstanding that Ford plants, as well as many automobile partsmakers and other manufacturers shut down or prepared to suspend for vacations and midyear inventories.

Steelmakers are convinced that the low point in steel production for the year has been passed, and that the industry shortly will overtake the rate of 54½ per cent at which it was operating early in February.

Reflecting the buoyant feeling in the market, scrap prices last week advanced again, 50 cents to $1 a ton. STEEL's scrap composite moved up 62 cents, the sharpest rise this year, to $11.25. Demand for semifinished steel and pig iron was stronger. Tin plate output increased 10 points to 90 per cent. Galvanized sheet production rose to 60 per cent, on farm and construction requirements; though full-finished sheets, used largely by the automobile industry, dropped 5 points to 40 per cent.

Automobile assemblies for the week held practically unchanged at 83,000 units. That industry's effort to level out peaks and valleys in production by advancing new models, with a favorable market, appears to be having a similar effect on steel. Substantial tonnages were placed last week for the new models. Ford's inquiry for upward of 140,000 tons of steel, with which it is trying to develop special prices, still pends, though Ford made a large routine commitment for cold-rolled sheets at the established market. Chevrolet will buy steel for 100,000 cars next month.

Industrial and commercial building construction is increasing. The 21,000 tons of structural shape awards for this purpose in July represents 35 per cent of the total, whereas the proportion in prior months this year was 22 per cent. Total awards last week declined to 5173 tons. The works relief program has not yet developed any important inquiries.

Fabricated structural steel prices are firming up, now that fabricators are filing all bids with the American Institute of Steel Construction. On the other hand, since reinforcing bar fabricators relinquished their code prices $1.50 to $2.50 under the market have been reported bid on government work.

Los Angeles is taking bids on 72,470 tons to 104,640 tons of reinforcing bars for the Colorado river aqueduct, largest inquiry for this material in the history of the Pacific coast.

Carbuilders closed last week on practically all the 50,000 tons of steel for 5125 Chesapeake & Ohio freight cars, and for more than 6000 tons for 500 New York subway cars. Norfolk Southern awarded 500 all-steel box cars. Argentine state railways are inquiring for 1000 box cars, requiring 12,000 tons of steel. Missouri Pacific purchased 10,000 tons of rails.

As in industrial building construction, steelmakers themselves are among the leaders in new equipment orders. Bethlehem Steel Co. has placed a $5,000,000 cold-rolled tin mill for its Sparrows Point, Md., plant, and Republic Steel Corp. is to rebuild its Stark sheet mill division, Canton, O. A special board has reported that $24,000,000 worth of machine tools is needed by the navy.

Pittsburgh district steelworks last week advanced 3 points to 41 per cent; Cleveland 7 to 48; Youngstown 3 to 49. New England was down 4 to 32, and others unchanged.

STEEL's iron and steel price composite is up 13 cents to $32.55, due to advances in scrap, while the finished steel index remains $54.

COMPOSITE MARKET AVERAGES

	July 27	July 20	July 13	One Month Ago June, 1935	Three Months Ago April, 1935	One Year Ago July, 1934	Five Years Ago July, 1930
Iron and Steel	$32.55	$32.42	$32.40	$32.42	$32.29	$32.32	$33.00
Finished Steel	54.00	54.00	54.00	54.00	54.00	54.05	51.90
Steelworks Scrap	11.25	10.63	10.34	10.45	10.75	10.30	12.58

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	July 27, 1935	June, 1935	April, 1935	July, 1934
Steel bars, Pittsburgh	1.80c	1.80c	1.80c	1.80c
Steel bars, Chicago	1.85	1.85	1.85	1.85
Steel bars, Philadelphia	2.11	2.11	2.09	2.09
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.00½	2.00½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.98½	1.98½
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.45
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.55
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.60	2.60	2.60	2.60

Semifinished Material

Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$28.40
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	28.40
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	27.40
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

Pig Iron

	July 27, 1935	June, 1935	April, 1935	July, 1934
Bessemer, del. Pittsburgh	$19.81	$19.81	$19.76	$19.76
Basic, Valley	18.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.	19.76	19.81	19.76	19.76
No. 2 foundry, del. Pittsburgh	19.31	19.31	19.26	19.26
No. 2, foundry, Chicago	18.50	18.50	18.50	18.50
Southern No. 2, Birmingham	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia	20.68	20.68	20.63	20.63
Malleable, Valley	18.50	18.50	18.50	18.50
Malleable, Chicago	18.50	18.50	18.50	18.50
Lake Superior charcoal, del. Chi.	24.25	24.25	24.15	24.04
Ferromanganese, del. Pittsburgh	90.13	90.13	89.85	89.79
Gray forge, del. Pittsburgh	18.67	18.67	18.63	18.88

Scrap

Heavy melting steel, Pittsburgh	$13.25	$12.25	$11.70	$12.00
Heavy melt. steel, No. 2, east. Pa.	9.75	9.30	9.15	8.90
Heavy melting steel, Chicago	11.25	10.25	10.05	9.55
Rails for rolling, Chicago	12.25	11.25	11.05	10.85
Railroad steel specialties, Chicago	12.75	11.75	11.25	10.50

Coke

Connellsville, furnace, ovens	$3.25	$3.50	$3.60	$3.60
Connellsville, foundry, ovens	4.00	4.60	4.60	4.60
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.17c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.42c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.07c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c
Gary, No. 10	2.60c
Gary, No. 20	3.20c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base con. (box) Pitts.	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.07c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

Pittsburgh	1.80c
Chicago or Gary	1.85c
Duluth	1.95c
Birmingham	1.95c
Cleveland	1.85c
Buffalo	1.90c
Detroit, delivered	1.95c
Pacific ports, f.o.b. cars, dock	2.35c
Philadelphia, del.	2.11c
Boston, delivered	2.22c
New York, del.	2.15c
Pitts., forg. qual.	1.95c-2.05c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	1.91c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail Steel

Straight lengths quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; pool cars, or less, 15c up. 10% dis. on nail extras on stright or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

Alloy	Diff.	Alloy	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.....0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni. 1.05
5100 0.80-1.10 Cr.....0.45
5100 Cr. spring.....base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van. 1.50
Carbon Van. 0.95
9250.....Carbon base plus extras

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23½-in. Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$20.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread	70-10-5 off
Rolled thread, ½ x 6, smaller	70-10-5 off

Machine Bolts

All sizes cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts stud bolts	70-10-5 off
Tire bolts	60-5 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Rolled thread machine, ½ x 6, smaller	70-10-5 off
Step bolts	70-5 off
Elevator bolts	70-5 off

Nuts

S.A.E. semifinished hex.; ½ to ⅞-inch	70-10-5 off
Do., ½ to 1-inch	70-10-5 off
Do., over 1-inch	70 off

Hexagon Cap Screws

Milled	85-10 off
Upset, 1-in., smaller	87½ off

Square Head Set Screws

Upset, 1-in., smaller	80 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75

Do. less carloads, 5 kegs or more no discount on size extras $3.05

Do. under 5 kegs; no discount on size extras $3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

Butt Weld

In.	Blk.	Gal.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel	
½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935 card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B.

Stnd. fitgs., Birm. base	$100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.67
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Cleve., Young.	27.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.25- 3.40
Connellsville, fdry.	4.00- 4.10
Connel. prem. fdry.	5.00- 5.10
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.20 9.65
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit ov., out. del.	8.50
Philadelphia, del.	9.03

Coke By-Products

Per gallon, producers' plants.

Tank lots	Spot
Pure and 90% benzol	15.00c
Toluol	30.00c
Solvent naphtha	30.00c
Commercial xylol	30.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	4.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
Delivered from Basing Points:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.08	.....	18.96	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.93	22.43	.....	.....
Brooklyn, N. Y., from Bmghm.	21.55	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.38	.....	19.40	.....
Cleveland from Birmingham	19.04	.....	18.92	.....
Indianapolis from Hamilton, O.	20.93	20.93	20.43	21.43
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.57	19.57	19.07	20.07
Muskegon, Mich., from Chicago, Toledo or Detroit	21.60	21.60	21.10	22.10
Newark, N. J., from Birmingham	20.61	.....	.....	.....
Newark, N. J., from Bethlehem.	20.99	21.49	.....	.....
Philadelphia from Birmingham	19.93	.....	19.1	.....
Philadelphia from Swedeland, Pa.	20.31	20.81	19.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	20.75	20.75	20.25	20.25

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	19.00	19.00	18.50	.....
St. Louis from Birmingham	†18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $23.50. Phila. base, standard and copper bearing, $24.63.

Gray Forge		Charcoal	
Valley furnace	18.00	Lake Superior fur.	21.00
Pitts. dist. fur.	18.00	Do., del. Chicago	24.25
		Lyle, Tenn.	21.50

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon: 2 to 3%, $1 per ton additional; each unit over 3%, $1 per ton additional.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$55.00

First Quality.

Pa., Ill., Md., Mo.	$45.00
Alabama, Ga., Ky.,	$40.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo.	40.00
Ga., Ala.	35.00

Ohio

First quality	$40.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	45.00
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$18.75-19.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$14.50

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsburgh	90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00

Spot, $5 a ton higher.

Silicomang., 2½ carb.	90.00
2% carbon, 95.00; 1%,	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont.	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: New York	Lead: East St. L.	Zinc: St. L.	Aluminum 99%	Antimony: Chinese Spot, N. Y.	Nickel: Cathodes
July 20	8.00	8.12½	7.50	52.50	51.00	4.15	4.00	4.30	*19.00	12.75	35.00
July 22	8.00	8.12½	7.50	52.75	51.50	4.15	4.00	4.30	*19.00	12.75	35.00
July 23	8.00	8.12½	7.50	52.45	51.30	4.15	4.00	4.30	*19.00	12.75	35.00
July 24	8.00	8.12½	7.50	52.50	51.15	4.15	4.00	4.35	*19.00	12.75	35.00
July 25	8.00	8.12½	7.50	52.00	51.00	4.15	4.00	4.40	*19.00	12.75	35.00
July 26	8.00	8.12½	7.50	52.37½	50.87½	4.15	4.00	4.40	*19.00	12.75	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets	
Yellow brass (high)	13.62½
Copper, hot rolled	15.00
Lead, cut to jobbers	7.75
Zinc, 100-lb. base	9.50
Tubes	
High yellow brass	15.37½
Seamless copper	15.25
Rods	
High yellow brass	12.12½
Copper, hot rolled	12.25
Anodes	
Copper untrimmed	12.75
Wire	
Yellow brass (high)	14.12½

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	4.50- 4.75
Cleveland	5.00- 5.25
Chicago	4.50- 4.75
St. Louis	4.50- 4.75
Heavy Copper and Wire	
*New York, No. 1	5.75- 6.00
Chicago, No. 1	5.75 6.00
Cleveland	5.00- 5.50
St. Louis, No. 1	5.50- 5.75
Composition Brass Borings	
*New York	4.00- 4.25
Light Copper	
*New York	4.62-4.87½
Chicago	4.12½-4.37½
Cleveland	4.50- 4.75
St. Louis	4.50- 4.75
Light Brass	
Chicago	2.25- 2.50
Cleveland	2.00- 2.50
St. Louis	2.25- 2.50
Lead	
New York	3.12½- 3.25
Cleveland	3.00- 3.25
Chicago	2.87½-3.12½
St. Louis	3.25- 3.40
Zinc	
New York	2.00- 2.25
Cleveland	2.00- 2.25
St. Louis	2.50- 2.65
Aluminum	
Borings, Cleveland	7.50- 8.00
*Mixed, cast, Clev.	12.25
Mixed, cast, St. L.	11.75-12.00
Clips, soft, Cleve.	13.50-14.00

SECONDARY METALS

Brass ingot, 85-5-5-5	8.00
Stand. No. 12 alum.	16.00-17.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.00
Boston, dock, expt...	8.50
Boston, domestic	7.00- 7.25
Buffalo, No. 1	10.75-11.25
Buffalo, No. 2	9.75-10.00
Chicago, No. 1	11.00-11.50
Cleveland, No. 1	11.00-11.50
Cleveland, No. 2	10.00-10.50
Detroit, No. 1	9.00- 9.50
Detroit, No. 2	7.50- 8.00
Eastern Pa., No. 1	10.50
Eastern Pa., No. 2	9.50-10.00
Federal, Ill.	8.00- 8.50
Granite City, R. R.	7.75- 8.25
Granite City, No. 2	7.00- 7.50
N. Y., deal. No. 2	7.50
N. Y., deal. barge	8.50
Pittsburgh, No. 1	13.00-13.50
Pittsburgh, No. 2	11.25-11.75
St. Louis	7.50- 8.00
Valleys, No. 1	11.50-12.00

COMPRESSED SHEETS

Buffalo, dealers	9.75-10.00
Chicago, factory	10.25-10.75
Chicago, dealer	9.00- 9.50
Cleveland	10.50
Detroit	9.50-10.00
E. Pa., new mat.	10.00
Pittsburgh	13.00-13.50
St. Louis	6.25- 6.75
Valleys	11.00-11.50

BUNDLED SHEETS

Buffalo	7.25- 7.75
Cincinnati, del.	6.50- 7.00
Cleveland	9.50-10.00
Pittsburgh	11.00-11.50
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	6.50- 7.00
Cincinnati	6.00- 6.50
Detroit	5.00- 5.50
St. Louis	4.75- 5.25

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	13.00-13.50
Chicago (3 ft.)	13.50-14.00
Chicago (2 ft.)	14.00-14.50
Cincinnati del	11.50-12.00
Detroit	11.50-12.00
Pitts., open-hearth, 3 ft. and less	15.00-15.50
St. Louis, 2 ft.& less	12.00-12.50

STEEL RAILS, SCRAP

Boston	7.50- 8.00
Chicago	11.00-11.50
Pittsburgh	13.25-13.75
St. Louis	9.75-10.25

STOVE PLATE

Birmingham	5.75- 6.00
Boston, dealers	3.50- 3.75
Buffalo	9.50-10.00
Chicago, net	6.50- 7.00
Cincinnati, dealers	6.00- 6.50
Detroit, net	6.50- 700
Eastern Pa.	8.50
N. Y., deal. fdry.	6.00
St. Louis	5.50- 6.00

COUPLERS, SPRINGS

Buffalo	12.75-13.25
Chicago, springs	12.50-13.00
Eastern Pa.	13.50
Pittsburgh	15.00-15.50
St. Louis	10.50-11.00

ANGLE BARS—STEEL

Chicago	13.00-13.50
St. Louis	10.00-10.50

RAILROAD SPECIALTIES

Chicago	12.50-13.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	12.75-13.25
Cleveland, billet, bloom crops	14.00-14.50
Eastern Pa., crops	13.00-14.00
Pittsburgh, billet, bloom crops	15.50-16.00
Pittsburgh, sheet bar crops	14.00-14.50

FROGS, SWITCHES

Chicago	11.00-11.50
St. Louis, cut	10.00-10.50

SHOVELING STEEL

Chicago	11.00-11.50
Federal, Ill.	8.00- 8.50
Granite City, Ill.	7.00- 7.50

RAILROAD WROUGHT

Birmingham	8.00- 8.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	9.75-10.00
Buffalo, No. 2	10.75-11.25
Chicago, No. 1, net	9.00- 9.50
Chicago, No. 2	11.00-11.50
Cincinnati, No. 2	8.00- 8.50
Eastern Pa.	10.50-11.00
N. Y., No. 1, deal.	7.25- 7.75
St. Louis, No. 1	6.50- 7.00
St. Louis, No. 2	8.00- 8.50

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	9.00- 9.50
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	9.75-10.00
Chicago, No. 1	9.50-10.00
Cinci., No. 1, deal.	6.50- 7.00
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	7.00- 7.50
Detroit, No. 1, new	8.00- 8.50
Valleys, new, No. 1	10.50-11.00

MACHINE TURNINGS

Birmingham	3.50- 4.00
Boston, dealers	2.00- 2.25
Buffalo	4.75- 5.25
Chicago	6.00- 6.50
Cincinnati, dealers	4.00- 4.50
Cleveland	6.50- 7.00
Detroit	4.75- 5.25
Eastern Pa.	6.00- 6.50
New York, dealers	2.50- 2.75
Pittsburgh	8.50- 9.00
St. Louis	2.25- 2.75
Valleys	8.25- 8.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	6.75- 7.00
Cincinnati, dealers	4.00- 4.50
Cleveland	7.00- 7.50
Detroit	5.25- 5.75
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	6.50- 7.00

CAST IRON BORINGS

Birmingham, plain	3.50- 4.00
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	6.75- 7.00
Chicago	6.00- 6.50
Cincinnati, dealers	4.00- 4.50
Cleveland	7.00- 7.50
Detroit	5.25- 5.75
E. Pa., chemical	11.00-12.00
New York, dealers	1.50- 1.75
St. Louis	2.00- 2.50

PIPE AND FLUES

Cincinnati, dealers	5.00- 5.50

RAILROAD GRATE BARS

Buffalo	7.50- 8.00
Chicago, net	6.50- 7.00
Cincinnati	4.50- 5.00
Eastern Pa.	8.50
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	4.75- 5.00
Buffalo	9.75-10.00
Cleveland	8.50- 9.00
Detroit	7.50- 8.00
Pittsburgh	11.00-11.50

FORGE SCRAP

Boston, dealers	4.50
Chicago, heavy	12.00-12.50
Eastern Pa.	9.50-10.00

ARCH BARS, TRANSOMS

St. Louis	10.00-10.50

AXLE TURNINGS

Boston, dealers	3.00- 3.50
Buffalo	7.50- 8.00
Chicago, elec. fur.	10.50-11.00
Cleveland	7.00- 7.50
Eastern Pa.	9.50
St. Louis	7.00- 7.50

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point.	10.00-10.50
Buffalo	12.50-13.00
Chicago, net	14.00-14.50
Eastern Pa.	16.00
St. Louis	12.00-12.50

SHAFTING

Boston, ship. point.	12.00-12.25
Eastern Pa.	17.50
New York, dealers	13.00-13.25
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	9.00-10.00
Boston, iron deal.	5.25- 5.50
Buffalo, iron	11.00-11.50
Buffalo, steel	12.75-13.25
Chicago, iron	11.50-12.00
Chicago, rolled steel	12.50-13.00
Cincinnati, iron	8.50- 9.00
Eastern Pa., iron	11.00
Eastern Pa., steel	13.50
Pittsburgh, iron	13.00-13.50
Pittsburgh, steel	15.00-15.50
St. Louis, iron	8.00- 8.50
St. Louis, steel	11.25-11.75

NO. 1 CAST SCRAP

Birmingham	8.50- 9.50
Boston, No. 1 mach.	8.50- 9.00
Boston, No. 2	7.50- 8.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	10.50-11.00
Buffalo, mach.	11.50-12.00
Chicago, agri. net	8.50- 9.00
Chicago, auto	10.00-10.50
Chicago, mach. net	10.00-10.50
Chicago, railr'd net	9.50-10.00
Cinci., mach. cup.	9.00- 9.50
Cleveland, cupola	11.50-12.00
Detroit, net	10.00-10.50
Eastern Pa., cupola	11.00-12.00
E. Pa., mixed yard	9.00- 9.50
Pittsburgh, cupola	13.50-14.00
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	8.00- 8.50
St. L., No. 1 mach.	9.00- 9.50

HEAVY CAST

Boston, del.	5.00- 5.25
Buffalo, break.	8.50- 9.00
Cleveland, break.	8.50- 9.00
Detroit, No. 1, mach. net	10.25-10.75
Detroit, break.	8.50- 9.00
Detroit, auto net	10.50-11.00
Eastern Pa.	10.50
N. Y., break. deal.	6.25- 6.50
Pittsburgh	12.00-12.50

MALLEABLE

Birmingham, R. R.	10.50-11.00
Boston, consum.	12.00-12.50
Buffalo	13.00-13.50
Chicago, R. R.	13.50-14.00
Cincinnati, agri. del.	9.00- 9.50
Cleveland, rail	14.50-15.00
Detroit, auto	11.00-11.50
St. Louis, R. R.	10.75-11.25
Eastern Pa., R. R.	11.00-11.50

RAILS FOR ROLLING

5 feet and over

Birmingham	10.50-11.00
Boston, dealers	8.00- 8.50
Buffalo	11.00-11.50
Chicago	12.00-12.50
Eastern Pa.	12.50-13.00
New York, dealer	8.50- 9.00
St. Louis	10.75-11.25

LOCOMOTIVE TIRES

Chicago (cut)	12.50-13.00
St. Louis, No. 1	9.00- 9.50

LOW PHOS. PUNCHINGS

Buffalo	12.50-13.00
Chicago	13.50-14.00
Eastern Pa.	13.00-14.00
Pittsburgh (heavy)	14.00-14.50
Pittsburgh (light)	13.50-14.00

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ores

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. low phos.	10.00-10.50
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish No. Africa basic, 50 to 60%	9.50
Tungsten, spot sh. ton unit, duty pd.	$15.50-16.00
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-19.00

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

	STEEL BARS	IRON BARS	REINFORCING BARS
Baltimore*	2.95c	3.40c	2.60c
Boston††	3.00c	3.31c	3.31c
Buffalo	3.00c	3.05c	2.10c-2.60c
Chattanooga	3.31c	2.75c	
Chicago	2.95c	3.17c	
Cincinnati	3.17c	3.36c	
Cleveland	2.95c	2.93c	
Detroit	3.04c	3.20c	
Houston	3.00c	3.25c	
Los Angeles	3.60c		
Milwaukee	3.06c		
New Orleans	3.30c		
New York‡(d)	3.26c		
Pittsburgh (h)	2.90c		
Philadelphia*	2.93c		
San Francisco	3.60c		
Seattle	3.60c		
St. Louis	3.20c		
St. Paul	3.00c		
Tulsa	3.25c		

	STEEL BARS	SHAPES
Cleveland (c)	2.10c	
Cincinnati	3.25c	
Houston	3.25c	
Los Ang., cl.	2.45c	
New Orleans	3.50c	
Pitts., plain (h)	3.05c	
Pitts., twisted squares (h)	3.175c	
San Francisco	2.45c	
Seattle	2.45c	
St. Louis	3.25c	
Tulsa	3.25c	
Young.	2.30c-2.60c	
Baltimore*		3.00c
Boston††		3.19c
Buffalo		3.25c
Chattanooga		3.56c
Chicago		3.20c
Cincinnati		3.42c
Cleveland		3.31c
Detroit		3.42c
Houston		3.00c
Los Angeles		3.60c
Milwaukee		3.31c
New Orleans		3.55c
New York(d)		3.37c
Philadelphia*		2.98c
Pittsburgh(h)		3.15c
Portland		3.55c
San Francisco		3.55c
Seattle		3.55c
St. Louis		3.45c
St. Paul		3.25c
Tulsa		3.50c

	PLATES	NO. 10 BLUE
Baltimore*	3.00c	3.10c
Boston††	3.21c	3.30c
Buffalo	3.37c	3.62c
Chattanooga	3.56c	3.36c
Chicago	3.20c	3.05c
Cincinnati	3.42c	3.22c
Cleveland, ¼-in. and over	3.31c	3.11c
Detroit	3.42c	3.14c
Detroit, ⅜-in.	3.65 c	3.35c
Houston	3.00c	3.70c
Los Angeles	3.60c	
Milwaukee	3.31c	
New Orleans	3.55c	
New York(d)	3.40c	
Philadelphia*	2.98c	
Phila. floor	4.95c	
Pittsburgh(h)	3.15c	
Portland	3.55c	
San Francisco	3.55c	
Seattle	3.55c	
St. Louis	3.45c	
St. Paul	3.25c	
Tulsa	3.50c	

	NO. 24 BLACK	NO. 24 GALV. SHEETS	BANDS	HOOPS
Baltimore*†	3.60c	4.30c	3.20c	2.30c
Boston (g)	3.95c	4.00c	3.30c	4.30c
Buffalo	3.25c	4.65c	3.42c	3.42c
Chattanooga	4.21c	4.86c	3.61c	3.30c
Chicago	3.85c	4.55c	3.30c	3.47c
Cincinnati	4.07c	4.72c	3.47c	
Cleveland	3.91c	4.61c	3.36c	
Detroit	3.94c	4.72c		
Los Angeles	4.35c	4.40c		
Milwaukee	3.96c	4.95c		
New York	3.89c	4.66c		
Philadelphia*†	3.60c	4.50c		
Pitts.** (h)	3.55c	4.50c		
Portland	4.40c	4.30c		
San Francisco	4.40c	5.00c		
Seattle	4.40c	5.00c		
St. Louis	4.10c	4.80c		
St. Paul	3.695c	4.19c		
Tulsa	4.75c	5.10c		

	Milwaukee	New Orleans	New York	Portland	Philadelphia*	Pittsburgh(h)	San Francisco	Seattle	St. Louis	St. Paul	Tulsa
COLD FIN. STEEL	3.16c	3.55c	3.31c	3.75c	3.08c	2.95c	3.75c	3.75c	3.30c	3.45c	3.70c
NO. 24 BLACK	3.60c	3.95c	3.25c	4.21c	3.85c	4.07c	3.91c	3.94c	4.35c	3.96c	3.89c
NO. 24 GALV. SHEETS	4.30c	4.00c	4.65c	4.86c	4.55c	4.72c	4.61c	4.72c	4.40c	4.95c	4.66c
BANDS	3.20c	3.30c	3.42c	3.61c	3.30c	3.47c	3.36c				
HOOPS	2.30c	4.30c	3.42c	3.30c	3.47c						

	Pittsburgh(h)	Portland	San Francisco	Seattle	St. Louis	St. Paul
COLD FIN. STEEL	3.70c	5.60c	6.15c	5.60c	3.55c	3.75c
Baltimore (c)	3.58c					
Boston	3.75c-3.90c					
Buffalo (h)	3.40c					
Chattanooga*	3.98c					
Chicago (h)	3.35c					
Cincinnati	3.57c					
Cleveland (h)	3.35c					
Detroit	3.49c					
Los Ang.(f) (d)	5.85c					
Milwaukee	3.46c					
New Orleans	4.15c					
New York	3.81c-4.31c					
Philadelphia	3.61c					
Pittsburgh	3.20c					
Portland (f) (d)	6.00c					
San Fran.(f) (d)	5.95c					
Seattle (f) (d)	6.00c					
St. Louis	3.60c					
St. Paul	3.05c					
Tulsa	4.50c					
COLD ROLLED STRIP						
Boston, 0.100-in., 500 lb. lots	5.35c					
Buffalo	3.39c					
Chicago	3.27c					
Cincinnati (b)	3.44c					
Cleveland (b)	3.20c					
Detroit	3.33c					
New York	3.36c					
St. Louis	3.36c					

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70–5
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif.; (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, July 25

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons	
		£ s d	Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON				
Foundry, 2.50-3.00 Silicon	$15.50	3 2 6	$13.72	1 14 0
Basic bessemer	15.50	3 2 6*	12.91	1 12 0
Hematite, Phos. .03-.05	16.35	3 5 6	.....	.....
SEMIFINISHED STEEL				
Billets	$27.28	5 10 0	$18.98	2 7 0
Wire rods, No. 5 gage	42.16	8 10 0	36.38	4 10 0
FINISHED STEEL				
Standard rails	$38.44	7 15 0	$36.34	5 10 0
Merchant bars	1.66c	7 10 0	1.14c to 1.19c	3 2 6 to 3 5 0
Structural shapes	1.63c	7 7 6	1.12c	3 1 6
Plates, †¼ in. or 5 mm.	1.77c	8 0 0	1.54c	4 5 0
Sheets, black, 24 gage or 0.5 mm.	2.04c	9 5 0	2.12c	5 16 0††
Sheets, gal., 24 gage, corr.	2.44c	11 5 0	3.19c	8 15 0
Bands and strips	1.88c	8 10 0	1.45c	4 0 0
Plain wire, base	2.04c	9 5 0	1.85c	5 7 6
Galvanized wire, base	2.38c	10 15 0	2.28c to 2.32c	6 5 6 to 6 7 6
Wire nails, base	2.65c	12 0 0	2.10c	5 15 0
Tin plate, box 108 lbs.	$ 4.46	0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

		£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16.74	3 7 6(a)	$17.24	260	$12.51	370	$25.44	63
Basic bessemer pig iron	17.36	3 10 0(a)*	12.27	185	11.15	330	28.06	(b)69.50
Furnace coke	4.09	0 16 6	7.96	120	3.72	110	7.67	19
Billets	27.28	5 10 0	28.51	430	18.25	540	38.97	96.50
Standard rails	1.82c	8 5 0	2.08c	694	1.65c	1,100	2.42c	132
Merchant bars	1.90c	8 12 0	1.68c	560	.90c	600	2.01c	110
Structural shapes	1.93c	8 15 0	1.65c	550	.90c	600	1.97c	107.50
Plates, †¼-in. or 5 mm.	2.00c	9 1 3	2.10c	700	1.05c	700	2.32c	127
Sheets, black	2.32c	10 10 0§	1.86c	620‡	1.24c	825‡	2.64c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.87c	13 0 0	3.81c	1,270	2.25c	1,500	6.77c	370
Plain wire	2.04c	9 5 0	3.39c	1,130	1.73c	1,150	3.17c	173
Bands and strips	2.07c	9 7 0	1.95c	650	1.26c	840	2.32c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b hematite. ††Close annealed

**Gold pound sterling carries a premium of 65.3 per cent over paper sterling.

—The Market Week—

Bars

Bar Prices, Page 52

Pittsburgh—Advance automotive buying and strong demand from farm implement manufacturers feature the bar market in both carbon and alloy grades. Prices are firm on the basis of 1.85c, Pittsburgh, for carbon steel bars, and 2.45c, base, Pittsburgh, on alloy bars.

Cleveland — Larger commitments by automobile manufacturers for new models feature the steel bar market. Buick placed substantial orders for spring steel, and may be the first to exhibit new cars, by Sept. 1. Coincident with the Ford vacation, July 26 to Aug. 12, many partsmakers are also shutting down for two weeks vacations and inventories. Other steel consumers, such as the General Electric, also are giving employes vacations. However, users have been anticipating their requirements much more generally than heretofore, and these interruptions are not expected to have much effect on steel shipments. Steel bar production here is at 50 per cent. Prices are firm.

Chicago—Diversification of steel bar demand remains an important feature of this market, with sales and specifications holding well. Little business has been booked for new automobile models, but this is expected shortly. Bars are steady at 1.85c, base.

Joseph T. Ryerson & Son Inc., Chicago, has been awarded 120,000 feet of mild steel, hot rolled, ¼-inch diameter, in 12¼-foot lengths for the Rock Island, Ill., arsenal at 3.13c, delivered, bids July 12.

Boston—Bar buying is steady but not heavy, as consumers take shipments in small lots close to immediate needs. Forging and alloy bars are relatively more active than carbon steel. Prices are steady and unchanged.

All 12 bidders quoted 4.355c, delivered, on 360 tons of nickel-steel bars for the Boston navy yard July 23 with the navy department, bureau of supplies and accounts, Washington.

New York—Steel bar sellers report buying is light, but steady. Foreign bars continue to be freely offered at substantial concessions under the domestic market, which has held steady.

Small flats and rounds are being offered by importers as low as 1.60c, duty paid, with 1.65c to 1.75c on heavier sizes of bars, shapes and plates.

Philadelphia — Commercial steel bars are moving slowly, with total specifications for this month likely to be under those of June. Cold finishers and bolt and nut makers

Another efficient ROCKWELL furnace again Armstrong's EF Brick Cuts B.T.U. Losses

Latest and most efficient type of continuous brass annealing furnace, built by W. S. Rockwell Co., is shown in the two views above. Uniform temperature is assured in this gas-fired furnace with walls of Armstrong's EF Insulating Fire Brick.

FOR more than forty-seven years, the W. S. Rockwell Co. has been designing and constructing modern industrial heating equipment . . . all sizes, for all purposes, using electricity, gas, oil, or coal. Naturally, such long experience has definitely proved to this company that proper insulating materials are required in building efficient furnaces.

In the construction of the gas-fired brass annealing furnace, shown above, Armstrong's EF Insulating Fire Brick were used, faced with Armstrong's Facing Cement and backed up with Armstrong's V-18 Block.

Use of Armstrong's EF Insulating Fire Brick insures accurate temperature control! And more! Since this light-weight semi-refractory brick requires no fire brick protection, it can be laid up in thinner walls. The result is less time required to bring the furnace to temperature, with a consequent fuel saving and speeding up of production.

For samples and data on EF Insulating Brick—and the other high temperature products in Armstrong's complete line—write to Armstrong Cork Products Company, Building Materials Division, 985 Concord Street, Lancaster, Pennsylvania.

High temperature products in Armstrong's complete insulation line include:

- ***Armstrong's N-16 Insulating Brick*** for temperatures up to 1600° F. behind the refractory.
- ***Armstrong's N-20 Insulating Brick*** for temperatures up to 2000° F. behind the refractory.
- ***Armstrong's A-25 Insulating Brick*** for temperatures up to 2500° F. behind the refractory.
- ***Armstrong's EF-22 Insulating Fire Brick.*** Light-weight semi-refractory brick for direct exposure up to 2200° F.
- ***Armstrong's EF-26 Insulating Fire Brick*** for direct exposure up to 2600° F.
- ***Armstrong's V-18 Block.*** Insulating block for use up to 1800° F.

Armstrong's

HIGH TEMPERATURE INSULATION

have bought less heavily so far this month. Prices are unchanged at 1.80c, Pittsburgh, or 2.11c, Philadelphia.

Plates

Plate Prices, Page 52

Pittsburgh—Steel plate sellers are interested in the outcome of the purchase by the Ohio River Co. of at least ten barges, and possibly more, minimum requirements for which would be about 2500 tons. Last week it was erroneously reported that contract had been awarded, as well as for two towboats which the company inquired for, but prospects favor early placing of the business. Inquiry of the Union Collieries Co., 315 North 120th boulevard, St. Louis, for 30 coal barges is current, as is the Mississippi Valley Barge Lines' inquiry for at least 20 barges. American Oil Co., Baltimore, which delayed bids on one to four steel barges, has set July 29 for closing date.

Cleveland—Practically all of the plate tonnage, amounting to approximately 30,000 tons, for 5125 Chesapeake & Ohio freight cars, has now been placed, in addition to the accessories, as reported last week. Machine tool builders are taking carload orders frequently, and miscellaneous orders are in substantial volume.

Elyria, O., has sold bonds and will be in the market shortly for about 1000 tons of plates for fabricated water pipe, and 500 tons for an elevated tank, government loans having been approved.

Chicago—Plate business has been aided by further orders for freight car material, but total tonnage for railroad use remains relatively light. Few plate orders are in prospect for pipe lines, while municipal tank construction is slow. Some industrial tank work is pending. Largest plate orders in sight are for public works.

Boston—Plate demand is light. Fabricators have little volume on books and are buying as needed in small lots. Outlook for shipyard activity is encouraging, but large tank inquiry is small. Prices are unchanged at 2.22c, Boston.

At 2.23c, delivered, Lukens Steel Co., Coatesville, Pa., has been awarded 150 tons for Portsmouth, N. H., while part of the 900 tons included in the navy opening June 18 is for Boston, Jones & Laughlin Steel Corp., Pittsburgh, securing the contract.

New York—Platemakers are figuring on 1200 tons of plates for five barges for the Pan American Petroleum & Transportation Co., New York. Plate tonnage for car construction is bolstering sales here. Miscellaneous business reflects a firm undertone.

Philadelphia—Plate tonnage is spotty and apart from distribution of steel for the 500 subway cars for the New York Board of Transportation, little outstanding business is noted. Bids will be opened here Aug. 2 on 500 tons or so of plates, shapes and bars for a ferryboat for the Virginia Ferry Corp., subsidiary of the Pennsylvania railroad, Broad Street Terminal building. Due to continued labor trouble, the New York Shipbuilding Co., Camden, N. J., has officially announced that it will not figure on the 13 navy vessels on which bids are to be opened Aug. 7, and for which more than 24,000 tons of steel will be required. This is a distinct blow to local plate sellers, as this was the only yard in this district likely to figure on this work. Plates are unchanged at 1.90c, Coatesville, Pa., or 1.99½c, Philadelphia. A district mill will supply 100 tons of plates for a stand pipe at Quakertown, Pa. Bids were closed July 23 on 175 tons of plates for the Philadelphia, Brooklyn and Charleston, S. C., navy yards.

San Francisco — Current plate in-

HIGH STRENGTH

"A.W." - "70-90"

STEEL *Reduce Dead Weight Increase Pay Load*

● This new super strength steel embodies *every* qualification demanded by modern engineering for a higher strength steel carrying less bulk and less weight.

Low Cost

PROPERTIES

1. HIGH STRENGTH . . .
   Yield Point (Lb. per sq. in.) . . 70,000 min.
   Tensile Strength (Lb. per sq. in.) 90,000 min.
   Elongation (% in 2 in.) . . . . . 20 min.
2. WELDABILITY . . .
   Excellent (no treatment required to prevent brittleness.)
3. CORROSION RESISTANCE . . .
   Superior to all ordinary steels.
4. FABRICATION . . .
   Cold Bends 180° flat upon itself.

ALAN WOOD STEEL CO. ESTABLISHED TRADE "A.W." MARK 1826 CONSHOHOCKEN, PA.

ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

BRANCH OFFICES:

Boston, New York, Philadelphia, Memphis, Seattle, San Francisco, Los Angeles

109 YEARS' STEEL MAKING EXPERIENCE

quiries call for small lots only. Two pipe lines in the southern part of California, one for Los Angeles and one for San Diego, are expected to come up shortly for figures and will require 10,000 tons and 4000 tons, respectively.

Seattle—Light gages of plates out of stock are in good demand for tank and boiler work. Puyallup, Wash., school board has received bids for a 30-foot steel tower and small water tank.

Contracts Placed

900 tons, bureau of supplies and accounts, navy department, Washington, delivery at various yards, opening June 18, divided, Jones & Laughlin Steel Corp., Pittsburgh; Enterprise Galvanizing Co., Philadelphia, and Ross Galvanizing Works, Philadelphia. Bulk of tonnage went to Jones & Laughlin Steel Corp. at $33,294.42.

225 tons, bureau of supplies and accounts, navy department, Washington, opening June 21 at Washington, 150 tons, Portsmouth, N. H., to Lukens Steel Co., Coatesville, Pa., at 2.23c, delivered; 75 tons, Mare Island, to Jones & Laughlin Steel Corp., Pittsburgh, at 2.4425c, delivered.

185 tons two barges, 100 x 24 x 7 feet, U. S. engineer, Mobile, Ala., to Alabama Dry Docks & Shipbuilding Co., Mobile, Ala.; bids June 24.

Contracts Pending

600 tons, four dump scows for New York state barge canal; delivery to Amsterdam, N. Y.

500 tons, approximately, plates, shapes and bars, ferryboat for the Virginia Ferry Corp., subsidiary of the Pennsylvania railroad, Broad street terminal building, Philadelphia; bids to be opened Aug. 2.

200 to 800 tons, one to four welded steel barges, for American Oil Co., Baltimore; bids postponed to July 29.

175 tons, navy yards at Philadelphia, Brooklyn, N. Y., and Charleston, S. C.; bids closed July 23.

Transportation

Track Material Prices, Page 53

Rail tonnage continues the most active item in railroad buying of steel. Missouri Pacific, under permission of the federal court, has placed 10,000 tons with Colorado Fuel & Iron Co., Denver, and Illinois and Inland Steel companies, Chicago. Nickel Plate has awarded 1000 tons to Inland Steel Co., Chicago, in addition to the 3000 tons placed a week ago. The former tonnage was divided, Illinois Steel Co., 1800 tons, and Carnegie Steel Co., 1200 tons. Seaboard Air Line is understood to be close to allotting 12,000 tons of rails on which it inquired some time ago. Norfolk & Western is said to have placed 500 tons with Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Carbuilders have tentatively placed more than 4000 tons of finished steel and 2000 tons of trucks, wheels and miscellaneous castings for the 500 subway cars recently bought by the New York board of transportation, with Pittsburgh and eastern mills. Norfolk Southern has awarded 500 all-steel box cars to Pullman-Standard Car Mfg. Co., Chicago, for construction probably at the latter's southern plants. They will require about 5000 tons of plain material and a substantial tonnage of wheels and axles.

Argentine State Railways is inquiring for 1000 box cars for which over 12,000 tons of steel will be required. Ergoli-Filyus Railways, Turkey, is inquiring for rolling stock that will require about 4000 tons of steel. Cerro de Pasco Copper Co., 44 Wall street, New York, is inquiring for 20 ore hopper cars for Peru, requiring about 300 tons, including axles.

Rail Orders Placed

Missouri Pacific, 10,000 tons divided among Colorado Fuel & Iron Co., Denver, and Illinois and Inland Steel companies, Chicago.

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DESIGNERS & MAKERS OF DEEP DRAWN
STAMPINGS

Nickel Plate, 1000 tons, to Inland Steel Co., Chicago.

Car Orders Placed

Norfolk Southern, 500 all-steel box cars, to Pullman-Standard Car Mfg. Co., Chicago, for latter's southern plants.

Car Orders Pending

Argentine State Railways, 1000 box cars.

Cerro de Pasco Copper Co., New York, 20 ore cars for Peru.

Ergoli-Filyus Railways, Turkey, miscellaneous rolling stock.

Locomotives Pending

Lung Hai Railway, division of Chinese National Railways, Nanking, China, 10 locomotives; bids asked.

Rail Orders Pending

460 tons, 70-pound steel rails, Grays Harbor, Wash., jetty extension; Columbia Construction Co., Bonneville, Oreg., low.

Buses Booked

American Car & Foundry Motors Co., 30 Church street, New York; Fourteen 35 passenger, for Eastern Massachusetts Street Railway Co., Boston; twelve 30-passenger, for Connecticut Co., New Haven, Conn.; nine 36-passenger for Southeastern Greyhound Lines, Lexington, Ky.; seven 30-passenger, for Capital Transit Co., Washington; two 28-passenger, for Blue Way Lines Inc., Springfield, Mass.; two 40-passenger, for Boston Elevated Railway, Boston; two 30-passenger, for Southern Pennsylvania Bus Co., Chester, Pa.

J. G. Brill Co., Philadelphia, thirteen 40-passenger trackless trolleys, for United Electric Railways, Providence, R. I.

Behind the Scenes with STEEL

Sex Rears Ugly Head

AN OLD question among editors (and advertisers) is whether or not the female form divine has any place in the pages of a business magazine. We know some editors who won't even touch a photograph tainted by feminine pulcheritude, let alone publish it. Lately, however, we guess they're unlaxing. Large advertisers have sold everything from cigarettes to lawnmowers by using pictures of beautiful models, and even staid editors are succumbing.

One marketer of gasoline and oil recently used tradepaper space, one half of which was taken up by a filmily-

gauzed nude. Did we hear somebody mention *Esquire?*

Such eye-arresting views have been scarce in magazines serving the metal industries, but a few weeks ago in STEEL, we saw a young lady in white shorts posed coyly behind a stainless steel tennis net. Come, come, editors, let us not forget our dignity!

* * *

Greetings

RECENT new subscriber to STEEL is WIAM Nautschno-Techn. Bib-ka, Potschtowij Jastschid 126, Moscow, USSR. Welcome, comrade, and may we hope you find it easier to translate from English to Russian than we do vice versa. Incidentally, we understand STEEL, in Russian, is Stalin who they say is The Tops over there.

* * *

Nitwits?

PUBLIC ignorance, that curse of democracies, has come in for a little charting by John Darr, New York public relations counsel, who has drawn up a lot of black lines and things to show what per cent of all there is to know on any given subject the public actually does know. Or are we getting too complicated?

Anyway, on the subject of steel, old John Public knows 5.4 per cent and is in the dark about 94.6 per cent. Take something like baking, though, and he bats 81.5 per cent in the "know" column and 18.5 per cent in the "ignorance column"; while on sporting events, according to the chart, the public scores perfectly, knowing 100 per cent of what there is to know. O.K., Mr. Public, tell us the score of the first game of the doubleheader yesterday between the Giants and Cards. Well, there's one you missed.

About all we can add is that we know 50,000 people who would score 99 44/100 per cent on what there is to know about steel. Who are they? That's easy—our great army of faithful readers. Touche, Mr. Darr!

* * *

Competition

WITH bated breath we're still waiting to see or hear what steelmakers are going to do about Daddy Warbucks' new metal—Eonite. Cheaper than steel and eight or ten times stronger, it's just something else to worry about.

* * *

Last Call!

MORE entries are coming in for our signature-interpreting contest which is now definitely in the homestretch. No letters dated after Aug. 1 will be accepted. Five-dollar prize winner will be announced in this department, Aug. 12 issue.

L. D. Authier, Barton-Warner Co., Sioux City, Iowa (STEEL covers Iowa like the corn), was inspired by our recent paragraph about the heat. He says way out thar in the West farmers are shoveling popped corn out of the fields and marketing it unprocessed (only a little butter and salt added), from roadway stands, with business good.

Taking the bull by the horns, he submits this contest entry:

SHRDLU Has Reader-appeal?—D-L-U-say!

That last word is "poetic license," Mr. A. informs us. (*Maybe his license should be revoked.*)

Can you stand another? O.K. Here is the explosive interpretation offered by H. J. Fullerton, secretary of the Pittsburgh Tool-Knife & Mfg. Co.:

See How Roosevelt's Donkey Left Us!

—SHRDLU

Sheets

Sheet Prices, Page 52

Pittsburgh—Improvement in demand for galvanized sheets has been a market feature over the past week. Production of galvanized now is about 60 per cent. New galvanized sheet buying is in standard widths and represents some stocking preparatory to fall repairs and building in the rural sections. Full-finished sheet demand is down slightly and operations in that branch of the industry are 38 to 40 per cent. Common black sheet production last week was steady at 55 to 60 per cent. With producers standing firmly on unchanged delivered prices for Ford Motor Co., the placing of its large inquiry was still held in abeyance late last week. Ford had previously signified that it would buy at least 45,000 tons of steel, mainly flat rolled, and possibly as much as 140,000 tons.

Cleveland—Ford Motor Co. has placed a large tonnage of cold-rolled sheets, but this does not apply on its recent heavy inquiry. It is understood that established market prices were paid. Ford suspended July 26 for a vacation until Aug. 12, when assembly of present models will be resumed, and making of parts for new models will be started. Many automobile partsmakers, as well as other sheet consumers, also are down for vacations, and some for inventories. Chevrolet, it is understood, will purchase steel for 100,000 cars next month. Other General Motors units, Chrysler, Buick and Hudson have been buying moderately for new models. The Cleveland sheet mill operated at 65 per cent last week, while an adjacent lake mill resumed on capacity schedule, and will hold this rate this week.

Chicago—A steady flow of specifications for sheets continues. A fair volume of business is being received from the automotive industry, but little of this is for new models. Only a minor interruption to orders is expected to result from the changeover to production of 1936 cars. Demand from other than the largest

consumers is well diversified, with slightly larger lots accounted for by building construction. Sheet prices are holding.

Boston — Sheet shipments are steady, small orders making up the bulk of volume. Buying is well distributed as to finishes. The total tonnage being placed, however, is barely maintained at the rate prevailing earlier this month.

New York—Although substantially better than last year and exceeding earlier trade expectations, it appears that sheet tonnage here this month will be off 15 to 20 per cent from June.

An oil company has distributed 725 tons of sheets here, principally No. 24 to No. 28 gage hot rolled annealed. Another oil company is reliably reported to have placed more than 350 tons.

Philadelphia—The sheet situation here is spotty, with fair buying in some quarters and very little in others. Bids will be opened July 31 on 250 tons of No. 25 gage license tag stock and 50 tons of galvanized-annealed sheets for Pennsylvania.

Buffalo—Sheet mills here operating at 45 to 50 per cent. Gains in output are indicated for the latter part of the summer.

Cincinnati — Sheet rolling schedules are sustained at better than 50 per cent. Miscellaneous demand has tended upward.

St. Louis—Demand for sheets is more active, with decided improvement in galvanized material.

Birmingham, Ala.—Sheet mills are meeting a fairly good demand. Agricultural interests have been buying, and still larger demand is expected from that source during the fall.

Pipe

Pipe Prices, Page 53

Pittsburgh — A few line pipe projects continue in the so-called active stage, but in the meantime, standard pipe and oil country goods were the backbone of July's specifications. The outlook is good especially for standard pipe. Lima Locomotive Works, Lima, O., is inquiring for around 75 tons of boiler tubes for five Chesapeake & Ohio locomotives it will construct.

Cleveland—About 800 tons of cast pipe have been awarded tentatively by several nearby small communities, with releases awaiting PWA approval. Steel pipe orders are limited mainly to jobbers' requirements, and for the month are holding close to the June level.

Chicago—Cast pipe orders and inquiries are slow and unimproved and still lag behind the rate a year ago. The city is in the market for 20,000 feet of 2½-inch standard steel pipe for the department of streets and electricity.

Boston—Cast pipe buying and inquiry continue slack. Merchant steel pipe is less active and tonnage projects are lacking.

New York—Cast pipe buying is in small lots, the TERA placing the bulk of such orders, 30 to 50 tons at a time. Inquiry is light and the volume done during the last two months has been disappointing to most foundries. Prices on open bids are generally firm, but contractors frequently shop for price concessions on cast pipe needs.

Philadelphia—Approximately 6240 tons of 10¾-inch steel pipe may be required for piling for foundation work for the proposed department of material building, Washington, on which contractors' bids are being asked.

Seattle—New projects are beginning to develop although no important tonnages are up for immediate action. Seattle plans four main extension projects, to cost $70,000, involving 8 and 12-inch pipe. Action

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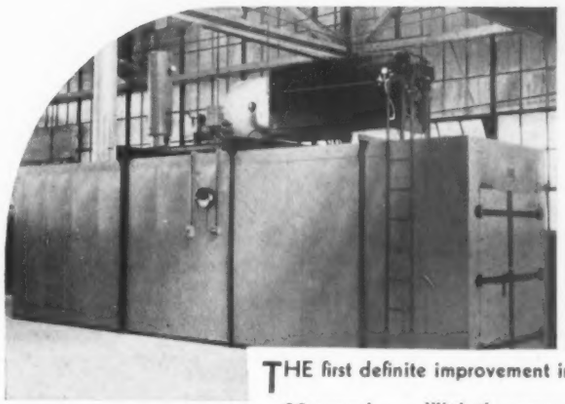

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awaits an agreement with federal agencies to furnish the labor involved. Olympia, Wash., plans replacement of 5 miles of wood pipe with cast iron.

Buffalo—Pipe demand continues active with many inquiries pending for early coverage. Water and gas line construction will continue on a large scale until late in the summer, it is expected.

Youngstown, O.—Republic Steel Corp. has shipped 1800 tons of 5½-inch welded pipe for an 85-mile line being installed in Texas by the Texas State Oil Co. The line will require about 4400 tons.

San Francisco—Demand for cast iron pipe remains exceptionally quiet for this season of the year. Pending tonnages all involve lots of less than 100 tons. It is reported that Price, Utah, will shortly come into the market for 1250 tons of 12-inch pipe. Unnamed interests were awarded 500 tons of steel pipe for the Boulder dam power house in Nevada.

Cast Pipe Placed

1500 tons, 24-inch and under, Fort Smith, Ark., to American Cast Iron Pipe Co., Birmingham, Ala., through B. M. Construction Co., Oklahoma City, Okla., general contractor.

1080 tons, mostly 6-inch, a total of 41,000 feet, Washington, to United States Pipe & Foundry Co., Burlington, N. J. Rudisill Foundry Co. awarded 81.5 tons specials, bids June 21. United States Pipe & Foundry Co. also awarded 100 lengths of small sizes included in opening of June 10.

256 tons, 16-inch, Heber City, Utah, to Pacific States Cast Iron Pipe Co., Provo, Utah.

Steel Pipe Placed

4400 tons, 5½-inch welded, 85-mile line for Texas State Oil Co., to Republic Steel Corp., Youngstown, O.

Steel Pipe Pending

Unstated tonnage, 20,000 feet of 2½-inch standard pipe for department of streets and electricity, Chicago; bids Aug. 1 to commissioner of public works.

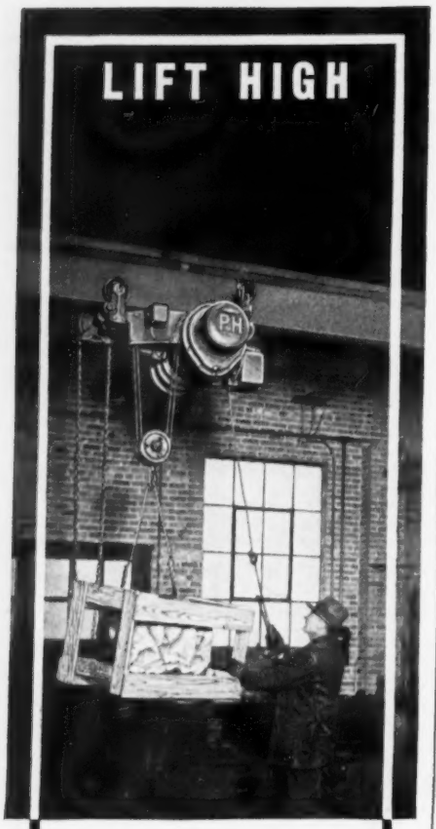
Wrought Pipe Pending

Unstated tonnage, 2425 feet of 12-inch, 18 bends and fittings, United States engineer office, Pittsburgh; bids July 30.

Cold Finished

Cold Finished Prices, Page 53

Pittsburgh—The automotive trade, miscellaneous manufacturers, jobbers, and farm implement makers are renewing specifications in heavier volume on cold-finished steel bars. Cold-drawn carbon steel bars are steady.



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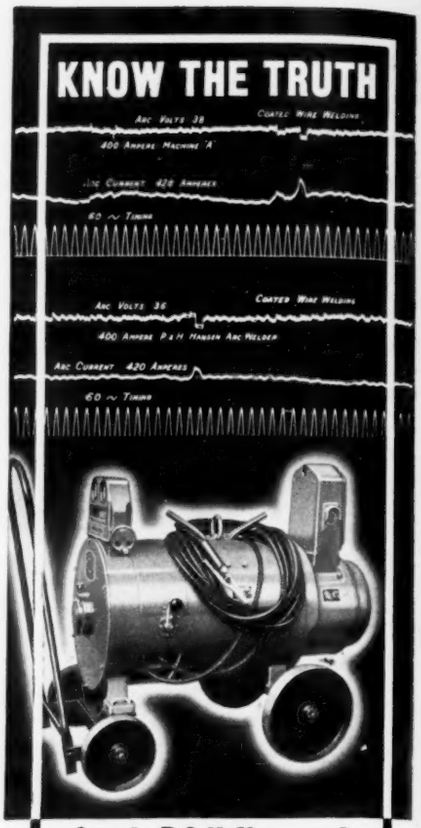

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Shapes

Structural Shape Prices, Page 52

New York—More bridge projects are up for bids, although there are few calls for large individual tonnages. Replacement of bridges in New York state, recently damaged by floods, will be expidited with both temporary and permanent structures. Most of these projects are small. One of the largest is a New York Central railroad bridge on its Pennsylvania division, about 900 tons.

Pittsburgh—Tonnage prospects in the steel piling market are decidedly favorable, and include such projects as 2100 tons for construction of lock and dam No. 9 and the raising of dam No. 8 in the Allegheny river at Kittanning, Pa., and construction of a coffer dam to permit the raising of the Elmsworth dam on the Ohio river, amounting to 1700 tons. York Engineering & Construction Co., York, Pa., is low on the former job and Dravo Contracting Co., Pittsburgh, is low on the latter.

Cleveland—Some of the small fabricating shops in this district have more work than at any time during the past year, but large tonnages are lacking. For four buildings at Cleveland's easterly sewage disposal plant 640 tons of shapes and 615 tons of reinforcing bars are pending. About 300 tons of lintels will be required for the Outhwaite housing project here, bids Aug. 9.

Chicago—Spencer, White & Prentis, New York, are low for the general contract for the Red Wing, Minn., river lock, with an eastern fabricator named to furnish the structural material. The work involves 1100 tons of fabricated steel and 1500 tons of piling. Other inquiries and awards are few, though fair activity continues in private work taking small individual tonnages.

Boston—Contracts and inquiries are light. Few fabricating shops are operating full time schedules.

Philadelphia—Early placing of 2600 tons of steel sheet piling is expected here. Shape prices are unchanged at 1.90c, Bethlehem, Pa., or 2.00½c, Philadelphia. Fabricated material prices are expected to become stronger, now that the new system of depositing copies of bids with the American Institute of Steel Construction has become effective. As noted in a previous issue of STEEL, these copies, which are filed by Structural Institute members with headquarters of that organization, are to be opened for comparison among the competitive bidders on a job after the tonnage has been awarded.

San Francisco—New bids are expected to be called for soon for 2851 tons of steel piling for Government Island, Oakland, Calif. Bids open on July 30 for 350 tons of piling for a seawall at Sausalito, Calif. Current awards are small.

Seattle—Bids have been opened by United States engineer, Portland, Oreg., for lock operating equipment at the Bonneville, Oreg., project, involving 1790 tons of shapes. For the Casper-Alcova, Wyoming, dam 878 tons of shapes and miscellaneous items are required. W. E. Callahan, Dallas, Tex., and Gunther & Shirley, Los Angeles, submitted the low joint bid of $1,482,651. Some important tonnages will be required for the dam and power plant proposed by Spokane, Wash., for which funds are now available.

Shape Awards Compared

	Tons
Week ended July 27	5,173
Week ended July 20	16,598
Week ended July 13	18,283
This week, 1934	19,620
Weekly average, 1934	16,284
Weekly average, 1935	14,459
Weekly average, June	16,473
Total to date, 1934	538,153
Total to date, 1935	448,227

Shape Contracts Placed

700 tons, Wyandotte high school, Kansas City, to Kansas City Structural Steel Co., Kansas City.

550 tons, state highway bridge, Lafourche parish, Louisiana, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

425 tons, plant addition, Crown Cork & Seal Co., Baltimore, through Consolidated Engineering Co., general contractor, that city, to the Belmont Iron Works, Eddystone, Pa.

415 tons, trashracks, etc., Tygarts valley dam, Grafton, W. Va., to Spuck Iron & Foundry Co., St. Louis.

400 tons, filtration plant, Springfield, Ill., to Hansell-Elcock Co., Chicago.

300 tons, shapes and angles, bureau of supplies and accounts, navy department, delivery at various yards, opening of June 25, bulk to Jones & Laughlin Steel Corp., Pittsburgh. Phoenix Iron Co., Portland, Oreg., awarded remainder at $1705.16, delivered, western yards.

294 tons, piling, foundations, medical center, Louisiana state university, New Orleans, to Inland Steel Co., Caldwell & Hart, New Orleans, general contractors.

200 tons, state highway bridge, Rodburn, Ky., to Lackawanna Steel Construction Corp., Buffalo.

200 tons, convent, Fond du Lac, Wis., to

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New York, Philadelphia, Cleveland, Detroit, Chicago.

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175 tons, addition, Elks Home, Wilmington, Del., to Belmont Iron Works, Philadelphia.

165 tons, tunnel ribs, metropolitan water district, Los Angeles, to Consolidated Steel Corp., Los Angeles.

160 tons, bloom storage and stock house extension, Timken Roller Bearing Co., Canton, O., to Fort Pitt Bridge Works, Pittsburgh.

150 tons, bridge, Village creek, Birmingham, Ala., to Virginia Bridge & Iron Co., Birmingham; Christine, Hutchinson & Burton Inc., general contractors.

145 tons, inspection shed, Brooklyn Bus Corp., Brooklyn, N. Y., to C. Frederick Wolf, Inc., Brooklyn.

125 tons, furnace steel, Rust Furnace Co., Lackawanna, N. Y., to Pittsburgh Bridge & Iron Co., Pittsburgh.

125 tons, bridge NRM 797, Travis county, Texas, to Virginia Bridge & Iron Co., Birmingham, Ala.

120 tons, structures for Allison Engineering Co. division of General Motors Corp., Indianapolis, to Austin Co., Cleveland.

119 tons, bridge, West Seneca, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa., with 33 tons of reinforcing bars to Joseph T. Ryerson & Son Co. Inc., New York; through E. Cerullo, Depew, N. Y.

105 tons, piling, for Knik river bridge project, Alaska road commission, to Bethlehem Steel Co., Bethlehem, Pa., and Alfred Dishow, Juneau, Alaska.

100 tons, high school, Pittsburgh, Calif., to Schraders Iron Works, San Francisco.

100 tons, additional, Panama theater, Miami Beach, Fla., to Ingalls Iron Works Co., Birmingham, Ala.; contract now estimated at 550 tons, previously reported in STEEL, July 22, as 450 tons.

100 tons, plant addition, Landers, Frary & Clark, New Britain, Conn., to Berlin Construction Co., Berlin, Conn.

Shape Contracts Pending

10,000 tons, estimated, department of interior building, Washington; foundation work includes an alternate involving both 6240 tons of 10¾-inch steel pipe and 1200 tons of steel sheets for piling.

2851 tons, piling, Government Island, Oakland, Calif.; new bids soon.

2600 tons, piling, jetty, Wilmington, Del., for United States engineer, Philadelphia; Thomas Earle & Sons, Philadelphia, low on general contract.

2600 tons, including 1500 tons of piling, lock No. 3, Red Wing, Minn.; Spencer, White & Prentis, New York, low for general contract. Independent Bridge Co., Pittsburgh, low for fabricated steel.

2500 tons, extension to archives building, Washington.

2100 tons, steel sheet piling, construction of lock and dam No. 9 and raising of the crest of dam No. 8 in the Allegheny river; York Engineering & Construction Co., York, Pa.; low on July 19 bids at $1,822,184.24.

1790 tons, lock operating equipment, Bonneville, Oreg., dam; bids in to United States Engineer, Portland, Oreg.

1500 tons, state bridge, Fifth street, Parkersburg, W. Va.; one 350-foot truss span.

1480 tons, steel sheet piling raising of the Ensworth dam, Ohio river near Pittsburgh; Dravo Contracting Co., Neville Island, Pittsburgh, low at $116,355.38 on July 20 bids.

1400 tons, depressed highway, Queens connection, Triboro bridge, New York; bids postponed to Aug. 8 from July 25.

1100 tons, bridges, Clinch river and Sycamore creek, over Southern railroad near Day's Mill, Tenn. TVA project; bids Aug. 12 direct.

900 tons, bridge, New York Central railroad, Pennsylvania division, New York state.

825 tons, bridges in connection with relocation of Baltimore & Ohio railroad, Tygart river reservoir, near Grafton, W. Va., bids to United States engineer, Pittsburgh, Aug. 19. Also 57,000 feet of right-of-way fencing.

800 tons, postoffice, Atlantic City, N. J., postponed to Aug. 6 from July 26. About 175 tons of reinforcing bars also required.

756 tons, grade crossings, Mariners Harbor and Elm Park, Staten Island rapid transit railroad; bids Aug. 12 to Baltimore & Ohio railroad, Baltimore.

750 tons, Wheeler power plant, TVA project; bids Aug. 5 direct.

700 tons, mill extension for galvanizing department, Newport Rolling Mill, Newport, Ky.

592 tons, four roller gates for the All-American Canal System, Boulder Canyon project, Arizona-California-Nevada; Dravo Contracting Co., Pittsburgh, low bidder at $101,400.

500 tons, Knoxville junior high school, Pittsburgh; Davis-Smith Co., 516 Federal street, Pittsburgh, low for general contract.

500 tons, transmission tower and substation, bureau of reclamation, Boulder City, Nev.

475 tons, three buildings, contract No. 87, easterly sewage disposal plant, Cleveland; bids Aug. 2. Also, 340 tons of reinforcing bars.

400 tons, state bridges, Bronx and Oneida counties, New York; bids Aug. 13.

400 tons, bridge, Augusta, Ind.

400 tons, bridge, Woodbury, Ga.

350 tons, auditorium, Fresno, Calif.; general contract to Stewart Shields & W. J. Ochs, San Jose, Calif.

350 tons, piling, seawall, Sausalito, Calif.; bids July 29.

350 tons, Toutle river span, Washington; bids in.

340 tons, Flathead river bridge, Montana; bids at Billings, Mont., July 30.

300 tons, lintels, Outhwaite housing project, Cleveland; general contract bids Aug. 9.

225 tons, factory building, Sterling Silk Glove Co., Allentown, Pa.

215 tons, state bridges, Tippecanoe, Springfield, Fort Jennings, O.; bids to highway commission, Columbus, O., Aug. 5.

200 tons, state highway bridge, Atlantic county, New Jersey; bids Aug. 5.

200 tons, shapes and plates, gates, Rochester, N. Y.

200 tons, bridge, East Tampa, Fla.

200 tons, theater and store building, Parkwood Training Co., Washington.

200 tons, state highway bridge, Atlantic City, N. J.

175 tons, theater, Camden, N. J.; bids July 29.

165 tons, administration building, contract No. 86, easterly sewage disposal plant, Cleveland; general contract to Hunkin-Conkey Construction Co., Cleveland. Also 275 tons of reinforcing bars.

150 tons, grade crossing, Baltimore & Ohio railroad; bids Aug. 9 direct on fabricated steel.

150 tons, steel sheet piling and fabricated structural steel, miscellaneous repair work for federal engineers at Pittsburgh; bids about Aug. 5.

125 tons, postal station "B," New York, Globe Blg. Corp., New York, low.

115 tons state highway bridge Brownville Junction, Me.

110 tons, state highway bridge, Dartmouth, Mass.

105 tons, garage, Boston elevated railway, Charleston district, Boston.

100 tons, extension main building, department of public works, Columbus, O.; bids July 31.

Unstated tonnage, plant buildings, Ft. Wayne, Ind., and Springfield, O., for International Harvester Co., Chicago.

Reinforcing

Reinforcing Bar Prices, Page 53

San Francisco — Bids will be opened Aug. 19 by the metropolitan water district, Los Angeles, on the largest tonnage of reinforcing bars in the history of the Pacific coast. The material is to be used in the construction of the Colorado river aqueduct and involves 72,470 tons to 104,640 tons. Alternate figures will be taken on the two groups, the first scheduled for delivery prior to July 1, 1936, and the latter prior to Jan. 1, 1939. Bids will be taken on 23,300 to 34,610 tons of either rail or new billet steel bars, on 12,550 to 23,000 tons of billet steel cut and bent, on 24,470 to 26,180 tons of bars fabricated into hoops, and on 12,150 to 20,850 tons of plain rods and bars for use in fabricating precast concrete pipe.

New York—Reinforcing steel buying has declined, small lots making up the bulk of limited volume. Quotations are less steady, with extras and various service charges sometimes waived.

New inquiry is slightly heavier, and district awards for the week total slightly more than 1000 tons. Mill prices on mesh are firm, but scattered concessions are reported among secondary sellers.

Pittsburgh—Interest in the market centered on the opening of bids July 26 by the Huntington, W. Va., army engineers' office on a Kanawha river roller gate dam, which involves about 2500 tons of new billet steel bars. Distributors are generally quoting 2.05c, base, Pittsburgh, for

Concrete Awards Compared

	Tons
Week ended July 27	**1,410**
Week ended July 20	**4,608**
Week ended July 13	**2,485**
This week in 1934	**6,758**
Weekly average, 1934	**4,084**
Weekly average, 1935	**4,333**
Weekly average, June,	**3,931**
Total to date, 1934	**142,036**
Total to date, 1935	**134,316**

cut lengths of new billet steel bars, carload quantities, but there have have been some instances where price shading has occurred among distributors.

Cleveland — Since reinforcing bar fabricators relinquished their code reports have been current of further price concessions, principally on public work. Some fabricators say $2.50 a ton under the established market was offered by one bidder on a tonnage for the Muskingum, Ohio, conservancy district. The low bid on 250 tons for delivery to the FERA at Cuyahoga Falls, O., was $1.50 under the market, but it is understood the bidder claimed a mistake was made and is revising his figure. For four buildings at Cleveland's easterly sewage disposal plant 615 tons of bars and 640 tons of shapes are pending.

Chicago—Orders for reinforcing bars are confined principally to small lots of which there continues a fair number for private work. Bids have been opened on 750 tons for the Mississippi river lock at Red Wing, Minn., with additional locks and dams scheduled for bids weekly through August. The federal work-relief program has yet to develop any substantial inquiries for bars in this district.

Seattle—W. E. Callahan, Dallas, Tex., and Gunther & Shirley, Los Angeles, were jointly low at $1,482,651 on bids received last week by the bureau of reclamation, Denver, on the Casper-Alcova, Wyoming, dam project, requiring 1100 tons of concrete bars. Columbia Construction Co., Bonneville, Oreg., submitted the low bid for the Grays Harbor, Wash., jetty extension to the United States engineer, Seattle. The tender was $359,060. This project takes 100 tons of miscellaneous items such as bolts, spikes and nuts.

Reinforcing Steel Awards

435 tons, Moon Lake dam, Utah, to unnamed interests.

350 tons, Rye Patch dam, Lovelock, Nev., to unnamed interests.

240 tons, Pine View dam, Ogden, Utah, to unnamed interests.

185 tons, warehouse addition, Sherwin-Williams Co., Newark, N. J.; to Austin Co., Cleveland.

100 tons, state bridge, Twin Falls county, Idaho, to unnamed interests.

100 tons, bars and shapes, parish hall and Sunday school building, Christ Lutheran church, Baltimore, to Concrete Steel Co., New York, and Acme Steel Engineering Co., Baltimore; J. Henry Miller Inc., Baltimore, general contractor.

Reinforcing Steel Pending

72,470 to 104,640 tons, Colorado river aqueduct, metropolitan water district, Los Angeles; specification 109; bids Aug. 19.

2500 tons, Kanawha river roller gate dam; bids received by Huntington, W. Va., army engineers, July 26.

2425 tons, Monrovia and San Rafael tunnels, metropolitan water district, Los Angeles; bids opened.

1700 tons, depressed highway, Queens connection, Triboro bridge, New York; bids postponed to Aug. 8.

1100 tons, also 878 tons shapes and miscellaneous items, Casper-Alcova dam, Wyoming; joint low bid by W. E. Callahan, Dallas, Tex., and Gunther & Shirley, Los Angeles.

850 tons, sewage project, Wards Island, New York; bids postponed to Aug. 1.

750 tons, lock No. 3, Red Wing, Minn.; Spencer, White & Prentis, New York, low for general contract.

590 tons, bridges and Wheeling & Lake Erie track locations at Dover, O., in Muskingum conservancy district. Also 187 tons of shapes, and 6040 tons of rails and fastenings; general contract to Arundel Corp., Baltimore.

340 tons, three buildings, contract No. 87, easterly sewage disposal plant, Cleveland. Also 475 tons of shapes. Bids Aug. 2.

312 tons, auditorium, Fresno, Calif.; general contract to Stewart Shields & W. J. Ochs, San Jose, Calif.

275 tons, mesh, state highway, Oneida county, New York; bids Aug. 13.

275 tons, administration building, contract No. 86, easterly sewage disposal plant, Cleveland. Also 165 tons of shapes. General contract to Hunkin-Conkey Construction Co., Cleveland.

269 tons, relocation, Baltimore & Ohio railroad, Tygart river reservoir, near Grafton, W. Va.; bids to United States engineer, Pittsburgh, Aug. 19.

250 tons, delivery to Cuyahoga Falls, O., for FERA; Tarrier Steel Co., Columbus, O., low.

200 tons, FERA, New York; direct purchases involving seven inquiries; bids in.

125 tons, sewer, Elizabeth, N. J.; Linde-Griffith Co. low.

115 tons, state highway, route 21, section 4A, Mulberry street to Clay street, Newark, N. J.; bids Aug. 12 with state highway commission, Trenton.

115 tons, state highway bridge, Dartmouth, Mass.

100 tons, Grays Harbor, Wash., jetty project; Columbia Construction Co., Bonneville, Oreg., low.

100 tons, span and overhead crossing, Twin Falls, Idaho; general contract to William Hoops, Twin Falls.

Strip Steel

Strip Prices, Page 53

Pittsburgh—Aside from the prospective purchase of a large tonnage of strip steel by a leading motorcar maker, which up until late last week had not been closed upon, the market currently reverts to strip steel orders of miscellaneous origin. The market is firm at 1.85c, Pittsburgh, for hot-rolled strip, and 2.60c, Pittsburgh or Cleveland, for cold-rolled strip.

Cleveland — Some substantial orders were placed by automobile manufacturers for new models, and the volume of this business is expected to increase over the next several weeks. Cold rollers pur-

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chased considerable material. The market is firm.

Chicago—Strip demand holds closely to the rate of preceding weeks this month. Miscellaneous strip consumers continue to buy steadily though usually for early needs despite the low level of inventories. Prices are steady.

Boston — Cold-rolled strip consumers are buying close to requirements, ordering frequently for early delivery. Mills have small backlogs. Prices are unchanged.

Philadelphia—Little variation is noted in the generally restricted volume of strip tonnage placed here in recent weeks. Prices are unchanged, with hot-rolled holding at 1.85c, Pittsburgh, or 2.16c, Philadelphia, and cold-rolled at 2.60c, Pittsburgh, or 2.91c, Philadelphia.

Wire

Wire Prices, Page 53

Pittsburgh—Shipments of wire products in the past week, while still sustained at an excellent volume, showed the effects of considerably heavier June buying. This was especially noticeable in wire rods. The late June buying spurt was confined to a week at the most; therefore, a sustained July closes with specifications and shipments ahead of June. On a Pittsburgh base, nails remain $2.60 a keg, spring wire, 2.90c, and plain manufacturing wire, 2.30c.

Cleveland—Demand for wire and wire products is holding up, tonnage booked by leading interests here this month being about equal to that in the comparable period in June. In some instances, consumers have been anticipating requirements.

Chicago—Wire demand is steady, with orders continuing well distributed. The automotive industry is counted on to furnish an even flow of business for several months. Further improvement in farm consumption of merchant products is looked for by fall as crop prospects continue moderately good and prices favorable. Wire prices are steady.

Boston — Incoming wire orders hold to the current rate. The midsummer decline has been less than anticipated. Mill prices are holding.

Pig Iron

Pig Iron Prices, Page 54

Pittsburgh—The carload-size order for pig iron in this district continues to predominate, although several steel mill equipment foundries, finding the steel specialty scrap market approaching the $16 level, have branched out and are buying some pig iron in the open market. However, their purchases of recent date have been confined to few hundred-ton lots. No important basic orders are in prospect in this district. The market is firm on a Pittsburgh district furnace base of $18.50 per ton for foundry grades, $18.50 for malleable, $18 on basic, and $19 for bessemer.

Cleveland—Pig iron demand holds its gains, with volume so far this month slightly ahead of the comparable period in June. A merchant lake furnace interest booked 2500 tons during the week, mainly in carload lots. Jobbing foundries and machine tool builders are figuring more frequently in these orders. Corrigan, McKinney Steel Co. lighted its fourth blast furnace last week, all of its stacks now being in operation, two on basic and two on foundry iron.

Chicago—Pig iron shipments make a more favorable comparison with those of June than was true earlier this month. The movement to date in July is off only about 10 per cent from last month against a drop of nearly 20 per cent two weeks ago.

Boston—Aggregate volume of pig iron shipments continues light, although small-lot sales are fairly well maintained. While the outlook for machine tool builders is improved, casting requirements have not yet been materialy felt in the pig iron market.

New York—General pig iron volume sagged here last week, excessively hot weather retarding foundry operations. The general undertone of the market continues good, however. Early resumption of activity by the Troy Furnace Co., Troy, N. Y., is expected. Attractive prices on Russian iron, said to be at least $2 a ton under the domestic market, are resulting in the purchase of some small trial lots.

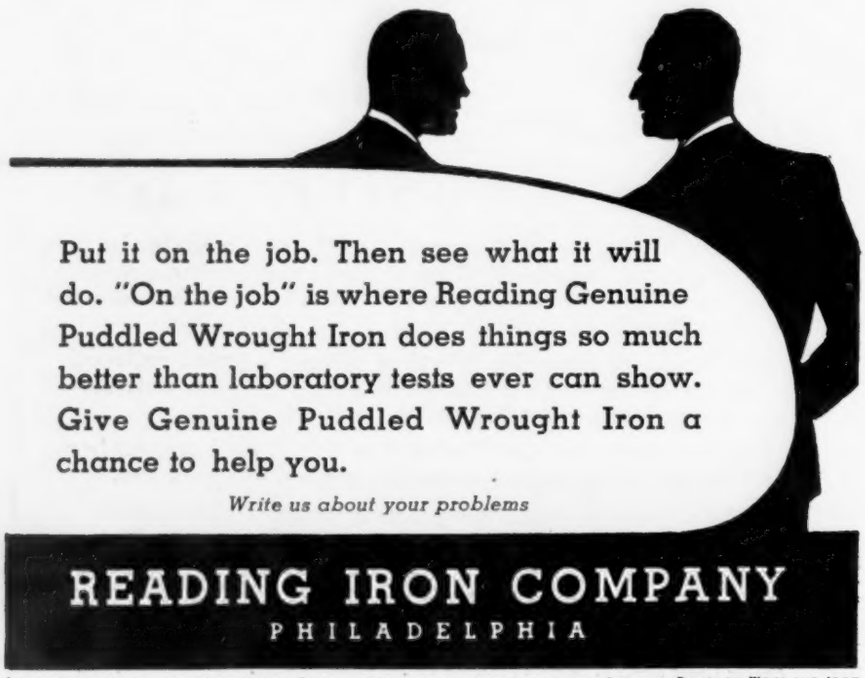
Philadelphia—Despite a lack of important orders, general pig iron specifications appear to be holding up well. In some quarters it is believed shipments this month may even exceed those of last month. Domestic prices are steady, notwithstanding lower offerings by foreign sellers.

Buffalo—The American Radiator Co. blast furnace at North Tonawanda will go into production this week, it is expected, bringing up to seven the number of operating units here. Demand for small lots continues good although there is no forward buying.

St. Louis—Activities in pig iron continue at a rate considerably above the seasonal average, both in purchasing and shipments. One distributor reports his aggregate shipments for July will be the largest for that month since 1930. The melt is being well sustained, with specialty makers, notably of farm implements and stoves, accounting for the major part of the tonnage.

Birmingham, Ala.—Steady purchasing in small lots, one to three cars at the time, maintains a firm pig iron market. Four blast furnaces continue on foundry and two on basic

Cincinnati—The pig iron market was featureless during the past week. Without prior inquiry, spot shipments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are being placed for an aggregate tonnage seasonally heavy. Most third quarter contracts were conservative and at the present rate of melt many supplementary orders must be placed later.

Toronto, Ont.—Business in the merchant pig iron markets showed minor falling off during the past week. Melters, however, continue to take iron as demands dictate. The daily melt continues around 45 per cent, with no indications of further improvement until about the first of September.

Scrap

Scrap Prices, Page 55

Pittsburgh—Recognizing a strong upward surge the net advance in steel and iron scrap was generally 75 cents a ton, placing No. 1 heavy melting steel at $13 to $13.50, substantiated by purchases of at least four consumers. The brokers' buying market has sympathetically advanced and offers to buy seem to range consistently at better than $12.75, and in some cases over $13.

Cleveland—Pronounced firmness is the rule in the local scrap market. Price advances have brought No. 1 heavy melting up to $11 to $11.50, but little material can be had at that price. Dealers generally are holding tightly to supplies in anticipation of further price increases. Corrigan, McKinney Steel Co. is shipping 700 tons of bloom crop ends from its 40-inch mill to Republic Steel Corp., at Canton, O., the shipment requiring 40 cars.

Chicago—Scrap prices are up $1 a ton here. Speculative demand from dealers and brokers for several weeks has strengthened the heavy melting steel market, and last week sellers paid as high as $11.50 delivered, for best quality and a mill bought a small tonnage at $11.25. Factory compressed sheets are sharply higher on a reported sale at $10.75. Prices on other grades have stiffened in sympathy.

Boston—Although operations are down, with one exception, New England steel works are buying slightly more heavy melting steel scrap and skeleton. For the former grades one steel works has paid $8, delivered for No. 1, but there are reports $8.50 and $7.50 has been paid for heavy melting grades delivered.

New York—Scrap buying is light and shipments to domestic consumers are small, although barges continue to move with heavy melting steel to the Buffalo district, but not in heavy volume. Dealers are paying the same prices for this material to ship through the canal as paid for export, which are unchanged at $8.50 to $7.50, barge.

Philadelphia—Number 2 heavy melting steel has advanced to a spread of $9.50 to $10, delivered, domestic consuming plant, on new buying, with No. 1 steel nominally higher at $10.50, delivered. A strong undertone prevails with even higher prices indicated. Heavy breakable cast, following a dip last week, is again $10.50 to $11, delivered. All other grades are unchanged.

Buffalo—An active dealer market for scrap is in effect. Offers for material to be shipped outside the district have broadened and have forced local dealers to raise bids to get material for contracts. In most instances dealers' bids are now fully up to peak prices paid by consumers in recent purchases. Competition for blast furnace scrap has resulted in the $7 level being reached in local offers.

Detroit—While much of the further rise in iron and steel scrap prices results from dealer speculation, the foundation for the market is becoming firmer and even at the higher levels dealers are not inclined to give prospective buyers too-long options. Bundles and rails are up $1 a ton, No. 1 steel 75 cents, most other grades except auto cast 50 cents.

Cincinnati—Dealer quotations on iron and steel scrap are 50 cents higher, with material being closely held by dealers. Speculative sentiment, on expectation of early fall buying at increased prices, was attributed partly to market strength in nearby districts and sustained steel works operations.

St. Louis — The market for iron and steel scrap is strong, with prices tending upward, mainly on steel specialties. Buying by consumers has not expanded but material is scarce and dealers are endeavoring to cover on contracts.

Birmingham, Ala.—Steel and iron scrap is lifeless with dealers and melters holding fairly large supplies.

Toronto, Ont. — Trading in iron and steel scrap is steady. Mills are taking delivery of heavy melting steel, but no demand is reported for turnings. Prices show no change.

Warehouse

Warehouse Prices, Page 56

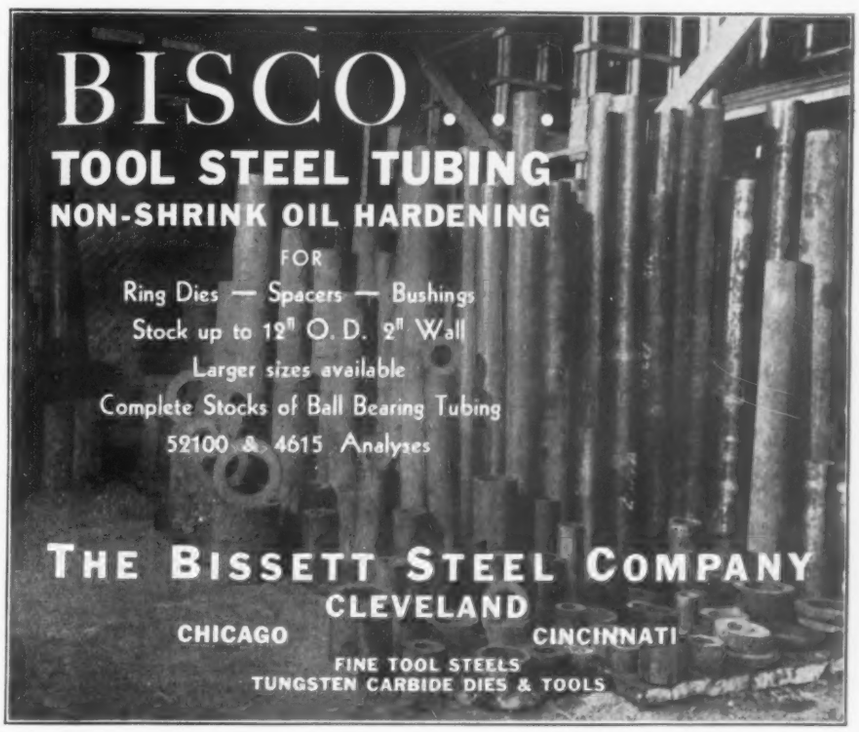
Pittsburgh—July will be a better month than April, May, or June in the Pittsburgh steel warehouse trade, but not equal to the high point for 1935, set in March. Prices are steady.

Cleveland — Warehouse bookings for the month are down considerably from the June average, both in number of orders and tonnage. Prices are steady.

Chicago—Sales are equal to, or slightly better than the volume a month ago. An even more favorable comparison is shown with July, 1934.

Philadelphia—Resale tonnage is light with jobbers' prices unchanged.

New York—Sales by warehouses are holding the current rate and July with most jobbers will equal June.



Some price irregularity exists, especially in sheets. Influx of sheet seconds is an unsettling influence.

Cincinnati—Final warehouse figures for July probably will show a small tonnage gain over June, reversing customary summer trends, and the greatest number of individual orders in five years for the corresponding month. Prices are steady and unchanged.

St. Louis—Distribution from warehouse is maintaining the volume of late June and the first half of the current month. Demand is well diversified.

Seattle—Settlement of the lumber industry strike is giving an impetus to wholesale trade. Jobbing business is spotty but holding its own. Prices are unchanged and generally maintained.

Tin Plate

Tin Plate Prices, Page 52

Pittsburgh—Shipments to canmakers in July are greatly reducing mill inventories. New orders for tin plate also are more numerous, with the result that the average of operations in the producing industry is almost 10 points higher to just under 90 per cent. One tin plate mill last week commenced rolling material for the first of the Pabst Brewing Co.'s Milwaukee, requirements. Another important brewery which has completed arrangements for canning beer is Fort Pitt Brewing Co., Pittsburgh.

Semifinished

Semifinished Prices, Page 53

A heavy volume of specifications particularly for sheet bars, billets, and skelp continues to be a feature of the semifinished market. A number of nonintegrated mills are building up stocks to a larger volume than they carried through May and June. The Pittsburgh base on billets, blooms and slabs continues $27 per gross ton; on sheet bars $28, and on common wire rods $38.

Metallurgical Coke

Coke Prices, Page 53

Sellers of beehive coke are getting around $3.25 to as high as $3.50, making no differentiation on analyses and sizes. A by-product seller in the Pittsburgh district is actively soliciting coke business as such, also regardless of size and quality, at $3.35 per ton. Owing to its own increased needs, another by-product seller here has withdrawn its offerings from the open market. The foundry trade appears able to purchase common beehive grades for $4 a ton and premium grades for around $5 per ton.

Steel in Europe

Foreign Steel Prices, Page 56

London—(*By Radio*)—Steel and iron trade in Great Britain continues active and two additional blast furnaces will be started shortly in the Middlesbrough district. Most steel departments are busy. Shipbuilding is showing improvement, Russia having ordered seven vessels to the value of £400,000. Exports of galvanized sheets are at a low level, but tin plate is moving fairly well.

Belgium has been taking substantial orders for steel for Russia since resumption of trade relations with that country. Germany reports export restrictions to meet intensified domestic demand. Some improvement is noted in French trade. In Austria Alpine Montangesellschaft has started an additional blast furnace.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 53

Through July the bolt and nut trade at Pittsburgh was slightly ahead of June from the standpoint of specifications and shipments. The price remains 70-10-5 off list for bolts and nuts, and 2.90c, Pittsburgh and Cleveland, 3.00c, Chicago, on large rivets. Small rivets are 70-5 off list. Small requirements of railroad car builders has held demand about equal with that of June at Chicago. Farm implement builders are specifying strongly.

Nonferrous Metals

Nonferrous Metal Prices, Page 54

New York—Advance of $2 a ton in zinc and wide fluctuations in tin prices were the outstanding developments in nonferrous metal markets last week.

Copper—Sales declined from an active to moderate pace last week but the market held firm at 8.00c, Connecticut, for electrolytic. Outlook is favorable for a steady price level for an indefinite period ahead.

Zinc—Prices advanced $2 a ton to 4.40c, East St. Louis, for prime western on active consumer demand, especially from galvanizers. Higher ore prices are looked for. The market is still in a stronge position for additional price advances.

Lead—Steadiness was the rule in the lead market both as to demand and prices. The open market was quoted unchanged at 4.00c, East St. Louis, 4.15c, New York, with St. Joseph Lead Co. still asking $1 premium on the latter market.

Tin—Acute shortage of tin on the London Metal exchange caused a sharp price rise there but by the end of the week quotations were lower. This was reflected in the domestic market with Straits spot jumping to 52.75c on Tuesday and then easing to around 52.00c by the end of the week.

Antimony—Prices held unchanged on the basis of 12.75c, duty paid, for Chinese spot. Demand continued light.

Equipment

Pittsburgh—Because several of the leading steel mill equipment interests in this district are carrying the largest order backlogs in their recent history, there have been numerous instances where requests have been made to farm out parts.

Contract has been awarded Mesta Machine Co. here for a $5,000,000 continuous cold rolling tin mill at the Sparrows Point, Md., plant of Bethlehem Steel Co. (see p. 12).

Cleveland—Republic Steel Corp. has announced a program for modernization of its Stark division sheet mill at Canton, O., expenditure of $850,000 being involved. New equipment will include roughing and finishing mills, cranes, six pair and pack furnaces, pickling machines, pack shear and cold rolling equipment (see p. 12).

Chicago—Machinery and equipment sales retain recent gains, while improved interest and inquiries are seen by sellers as auguring well for future business.

Boston—Machine tool buying and inquiry has made additional gains, contrary to the usual seasonal slump. Airplane engine builders are operating at capacity in some eastern plants and are buying "fill-in" machinery in fair volume, notably in the Hartford, Conn., district.

New York—With inquiry active and well spread, machinery and plant equipment orders continue to retain the improvement registered during recent weeks. Automobile plants are buying, Ford Motor Co. having purchased lathes and other standard tools. Chrysler also has placed orders for new equipment with indications of heavier buying in the near future. American Locomotive Co., Dunkirk, N. Y., has also bought some heavy machinery, including boring equipment.

Seattle—Business is steady, Alaskan mining and other industries continuing to buy in good volume. Dredging machinery is moving well.

Construction and Enterprise

Illinois

CHICAGO—City Elevator Co. Inc., 224 North Clinton street, has been incorporated with 120 shares common stock to manufacture passenger and freight elevators, parts and accessories.

CHICAGO—United Autographic Register Co., 5000 South California avenue, is taking bids on a plant addition to cost $30,000 with equipment. M. L. Peseira, 100 West Monroe street, is engineer.

CHICAGO — General Chromium & Copper Corp., 325 West Huron street, has been incorporated with 100 shares common stock to manufacture metal devices and appliances, by E. W. Weiss, 10 North Clark street.

CHICAGO—Milled Screw Products Co., 2016 West Lake street, has been incorporated with 300 shares common stock to manufacture machine screw products, by Benjamin S. Mesirow, 1212 Conway building, 111 West Washington street.

CHICAGO—International Harvester Co., Michigan avenue and Harrison street, will spend about $1,750,000 for expansion of its motor truck plants at Fort Wayne, Ind., and Springfield, O. The program includes plant remodeling and installation of some new equipment.

CHICAGO—International Harvester Co., Michigan avenue and Harrison street, will build a 1-story power plant at its works on Blue Island avenue, 50 x 119 feet, to cost $75,000. O. A. Krueger, 606 South Michigan avenue, is company architect.

CHICAGO—American Coal Burner Co., 105 West Adams street, has been organized by Max W. Zabel, Arthur W. Carlson and Green Wells, to manufacture apparatus and parts for use in connection with fuel burning devices. Correspondent: Zabel, Carlson & Wells, 2500 Bankers building.

CHICAGO—Datascope Corp., 222 West North Bank building, has been incorporated to manufacture apparatus, machinery, devices and instruments for projection or transmission upon screens, by L. M. Wain, T. B. Gibbs and Joe M. Egloff. Correspondent: Joseph W. Greaves, 222 West North Bank building.

LA SALLE, ILL.—Voters have approved $750,000 bonds to finance construction of a municipal electric light and power plant.

PEORIA, ILL.—Fire destroyed rackhouse and damaged other units of distillery of Hiram Walker Distilling Co. here. William Hull is general manager.

New York

ALBANY, N. Y.—Schenectady Steel Salvage Corp. has been incorporated with 100 shares no par value to process and deal in ferrous and nonferrous metals, by Samuel Tapper, 152 South Knox street, Albany, N. Y., and associates.

BATAVIA, N. Y.—Massey-Harris Co., Racine, Wis., manufacturer of farm implements, will reopen its plant at Batavia within 30 days and employ 600 workers.

BUFFALO—American Radiator Co. will build an addition to its plant here, installing electric motors, controls and accessories. Total cost about $100,000.

ROCHESTER, N. Y.—American Laundry Machinery Co., Buffalo road, is building a castings cleaning building. Werner, Spitz Construction Co. Inc., 11 Comfort street, Rochester, is contractor.

Pennsylvania

JOSEPHTOWN, PA. — St. Joseph Lead Co., Josephtown, Pa., will build a sluiceway on the left bank of the Ohio river here.

MCKEES ROCKS, PA.—Socony-Vacuum Oil Co., New York, will build a bulk gasoline plant on a 160 x 400-foot site on Robb street, here.

MEADVILLE, PA.—Viscose Co. of America, Marcus Hook, Pa., is building four additions to its cellulose rayon plant here, which will be equipped with electric motors, controls, conveyors and other accessories. Total cost will be about $175,000.

Ohio

BLUFFTON, O.—Triplett Electrical Co. has given a contract to the Austin Co., Cleveland, for construction of a plant here.

CANTON, O.—Sheet mill of the Stark division of the Central Alloy district of the Republic Steel Corp., at Canton, will be entirely modernized at cost of $850,000 for new equipment and added space, including three automatic three-high roughing mills, four two-high finishing mills, cranes, substations and power lines, six pair and pack furnaces, additional pickling machine and new pack shear and cold-rolling equipment.

DAYTON, O.—Structural Metal Products Co. has been incorporated with 250 shares no par value by Gilbert R. Eichelberger, 1022 East Fifth street, and associates.

JACKSON, O.—City council plans extensions and improvements in municipal electrical distribution system. Cost estimated at $28,000. Proposed work to begin soon.

LYNCHBURG, O.—Lynchburg Distilling Co. plans to recondition and install new equipment in its distillery. Estimated cost $250,000. J. L. Bennett, president.

NEW MADISON, O.—Village has been granted loan of $22,000 for construction of complete waterworks system.

PORTSMOUTH, O.—Plant of the Wheeling Steel Corp. here recently suffered severe damages by fire.

SHELBY, O.—Shelby Metal Products Co. has started construction of an addition costing $20,000, for storage purposes.

TOLEDO, O.—Midwest Vehicle Corp., has bought the plant of the Monarch Products Co., Tiffin, O., and will put it into production of a line of children's vehicles about August 1. A leased plant at Sandusky will be abandoned.

Michigan

DETROIT—Bohn Aluminum & Brass Corp., 2512 East Grand boulevard, will build an addition to its plant No. 8, 2601 Clay street. L. W. Buckheit is in charge of plans.

DETROIT—Chevrolet Motor Co. has awarded a contract to J. A. Utley, 6031 Mansur, for an addition to its forge plant on East Euclid avenue, Detroit. Albert Kahn Inc., Detroit, is architect.

DETROIT—Arrow Distillers Corp., 3539 Concord, has started construction of an addition to its main building, to cost about $10,000.

DETROIT—Ajax Stampings Inc., 4250 West Jefferson avenue, has been incorporated with $10,000 capital to manufacture metal stampings, by Max Smitt, 2232 Buhl building.

GLADSTONE, MICH.—City plans construction of a municipal electric light and power plant to cost $109,000, through federal aid. Shoecraft, Drury & McNamee, Ann Arbor, Mich., are engineers.

GRAND RAPIDS, MICH.—Service Stoker Co., 501 Front avenue, has been incorporated with $50,000 capital to deal in coal stokers, by Russell Halladay, 831 Madison avenue.

NEW HAVEN, MICH.—New Haven Foundry Co. has let contract to the Austin Co., Cleveland, for a foundry unit.

TAWAS CITY, MICH.—Funds have been approved for a water system at Tawas City, costing $26,950. Francis Engineering Co., Saginaw, Mich., is engineer.

Indiana

INDIANAPOLIS — Dirigold Metals Corp., 1156 Consolidated building, has been incorporated with 1000 shares capital stock to manufacture metals and alloys, tools and machinery, by Homer E. Schneider, John A. Wittgren and Simon C. Witmer.

INDIANAPOLIS—United States Engineering Corp., 1511 West Washington street, has been incorporated with 1000 shares no par value to manufacture automotive and aeronautical accessories and equipment, by Vance C. Hall, George E. Campbell and M. G. Main.

INDIANAPOLIS—Allison Engineering Co., subsidiary of General Motors Corp., has given a contract to the Austin Co., Cleveland, for a four-unit plant for the manufacture of a high-powered, liquid-cooled aviation motor. Plant will cover 41,000 square feet of floor space, main unit 122 x 251 feet, engine test unit 50 x 122 feet, carpenter shop 50 x 90 feet and power house 32 x 32 feet.

LA GRANGE, IND.—Department of waterworks, L. Wemple chairman, plans to install waterworks improvements, including electric turbine pumps and elevated steel tank. C. Hurd, Architects & Builders building, Indianapolis, is architect.

Missouri

COLUMBIA, MO.—City plans extension to its power plant to cost $225,000, including turbo-generator unit, boilers and other equipment. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is consulting engineer.

GALENA, MO.—City, George J. Tuttle mayor, has applied for PWA loan of $40,000 for waterworks system, including 50,000-gallon steel tank on tower. Gordon W. Fletcher, 417 South Robertson avenue, Springfield, Mo., is engineer.

ST. LOUIS—Standard Stamping Corp. has been incorporated with $80,000 capital, by F. J. Schroeder, 803 Haven street, and associates.

ST. LOUIS—Plant of the Buck's Stove & Range Co. is being purchased by the Mallinckrodt Chemical Works, 3600

(*Please turn to Page* 71)

Simonds Cut Gears

SPUR—BEVEL—MITRE & WORM—RACK
CUT TEETH—SPECIAL MACHINERY . .

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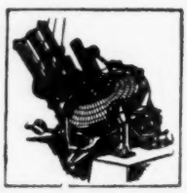

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(Concluded from Page 69)

North Second street, negotiations being practically closed. The latter will use it for storage purposes.

Texas

BEAUMONT, TEX.—W. M. Kellogg Co., 225 Broadway, New York, will build topping and cracking unit for Magnolia Petroleum Co., Magnolia building, Dallas, Tex.; capacity 36,000 barrels daily; to cost $1,500,000; construction to start in August.

BROWNSVILLE, TEX.—City, R. B. Rentfrow, mayor, will receive bids July 31 for transformers required in reconstruction of electrical distribution lines.

HASKELL, TEX.—City has voted $35,000 bonds for a waterworks plant, including elevated steel storage tanks, pumping equipment. PWA loan and grant of $45,000 has been approved. Morey & Morey, Praetorian building, Dallas, Tex., are engineers.

SAN ANTONIO, TEX.—City plans installation of steel pipe line for natural gas distribution. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is making a preliminary survey.

TEXAS CITY, TEX.—Pan American Petroleum & Transport Co., 122 East Forty-second street, New York, is reported to have let contract to McClintic-Marshall Corp., Behlehem, Pa., for a unit to duplicate existing plant, costing $1,500,000, construction to start in September.

Wisconsin

GENOA, WIS.—Maj. Dwight F. Johns, United States district engineer, 615 Commerce building, St. Paul, will receive bids until late in August for construction of dam No. 8 in the Mississippi river, including cofferdams, five roller gates, 10 taniter gates and service bridge, about 1600 tons of structural steel, 560 tons of reinforcing steel and 140 tons of steel castings.

GREEN BAY, WIS.—Libert Machine Co. has been incorporated to conduct a general foundry and machine shop business by Milton A. and Erwin J. Libert and F. P. Cornelison.

MILWAUKEE—Mertes-Miller Inc. has been incorporated with 350 shares no par value to manufacture steel boilers, lard and oil tanks and similar devices, by C. Lavarmway and associates.

MILWAUKEE—A. George Schulz Co., 433 West Clybourn street, manufacturer of paper boxes, is building a 1-story addition 42 x 59 feet. Frank F. Drolshagen, 647 West Virginia street, is architect.

MILWAUKEE—City sewerage commission is preparing an application for federal funds for additions and improvement to city sewage purification plant on Jones island, to cost $500,000, including repairs to powerhouse, new 1000-horsepower boiler, ash and chaff conveyor, sludge pump, incinerator and loading equipment.

NEENAH, WIS.—E. G. Zabel Co., has been incorporated with $35,000 capital to manufacture duplicating machines and printing devices, by E. G. Zabel and associates.

Minnesota

DULUTH—Marine Iron & Shipbuilding Co. has been given a contract by the United States government for two steel work launches for the Washington engineering district and two for the Wilmington, N. C., district.

SPRING VALLEY, MINN.—Bids will be taken soon on a municipal electric light and power plant with diesel engine generator units, to cost $110,000. G. M. Orr & Co., Baker building, is engineer.

ST. PAUL—Minneapolis-St. Paul sanitary district, Milton Rosen secretary, will take bids soon for an addition 150 x 160 feet to house grit and screen chambers, building to cost $80,000 and equipment $175,000. Work is part of the $18,000,000 metropolitan sewage disposal project under construction.

TYLER, MINN.—City plans to purchase a 280-horsepower electric light plant unit for the municipal light and power plant, to cost about $35,000.

Iowa

IOWA CITY, IOWA—City will ask bids soon on a municipal electric light and power plant and distributing system, $917,000 being available for the purpose. Burns & McDonnell Engineering Co., 107 Linwood avenue, Kansas City, Mo., is engineer.

MARENGO, IOWA—J. LeRoy Farmer Canning Co., Cedar Rapids, Iowa, will operate the plant of the Iowa Valley Canning Co., idle three years and is making repairs and installing new equipment.

SIOUX CITY, IOWA—Standard Stove & Equipment Co. has been incorporated with $10,000 capital by L. P. Neilson, president, and Lloyd Peterson, secretary.

VILLISCA, IOWA.—City will ask bids soon on a municipal electric light and power plant and distribution system, for which a fund of $140,000 is provided. Burns & McDonnell Co., 107 West Linwood avenue, Kansas City, Mo., is engineer.

Nebraska

COLUMBUS, NEBR.—Loup river public power district, Harold Kramer, Columbus, Nebr., secretary, will receive bids until July 30 for bridges and railway siphons, requiring 475 tons of reinforcing steel, 134 tons of structural steel and eight tons of sheet piling. Harza Engineering Co., 20 North Wacker drive, Chicago, is engineer.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids July 30 for one metal-cutting hack saw for delivery at Norfolk, Va.; schedule 5614.

WASHINGTON—Bureau of supplies and accounts, navy department, will open bids July 30, schedules 5612 and 5613, for motor-driven turret lathes for delivery at Norfolk, Va., and Puget Sound, Wash.; Aug. 6, schedule 5656, for impact testing machine for delivery at Washington; schedule 5639 for motor-driven universal cutter and tool grinder for delivery at Philadelphia; Aug. 9, schedule 5637, for table type automatic indexing drilling machines for delivery to Washington.

Pacific Coast

LOS ANGELES—United States Spring & Bumper Co., East Fifteenth street and Magnolia avenue, is building an addition for steel storage and additional manufacturing facilities, including furnaces, hammers, forming and grinding machinery, to cost over $100,000.

PORTLAND, OREG.—Pacific Power & Light Co., Paul B. McKee president, will build a 66,000-volt transmission line from Ariel dam, Washington, to Longview, Wash., to connect with the Washington Gas & Electric Co. system. Cost will be about $190,000.

SALEM, OREG.—State highway department has 100 road projects ready for federal approval; for roads and highways $3,038,624 is available and for grade crossing elimination $2,334,204.

SEATTLE—George Automatic Train Control Co. Inc., 1017 Minor avenue, has been formed with $50,000 capital by George C. George and associates.

SEATTLE—California Bag Co., has bought a two-story building at Spokane street and East Marginal Way which is being rebuilt and equipped for larger production.

SPOKANE—City has been granted $193,500 federal funds for the $687,500 hydroelectric plant and dam for which the city has $500,000, proceeds of a water department bond issue. Work probably will not be started until 1936.

Dominion of Canada

OSHAWA, ONT.—General Motors of Canada is spending more than $300,000 in plant expansion and new equipment and will manufacture parts and tools not heretofore made in Canada.

SARNIA, ONT.—Electric Auto Light Co. Ltd., A. Minch manager, plans a plant addition to cost about $50,000.

TORONTO, ONT.—Coleman Lamp & Stove Co. Ltd., is enlarging its plant.

TORONTO, ONT.—Pease Foundry Co. Ltd. is increasing its facilities to meet enlarged business.

TORONTO, ONT.—Standard Cycle Products Ct. Ltd. is moving its plant and offices to larger quarters to care for increased production.

Works Program Applications

The following are applications filed with the division of applications and information of the President's work relief program, in Washington, for allotment of funds. An application does not necessarily indicate the program will mature:

Oklahoma City, Okla.—For construction of sewage disposal plant, $18,898.

New York—For power plant building and equipment at Neponsit Beach hospital, $215,181.

Detroit — For four incinerator plants, $802,000.

Highland Park, N. J.—For sewage disposal plant and intercepting sewers, $145,500.

Fisher, Ill.—For waterworks, including pumps, elevated storage tank, $27,500.

Metuchen, N. J. — For extensions and alterations to sewage treatment plant, $52,500.

Lansing, Ill.—For sewage disposal plant, $29,454.

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